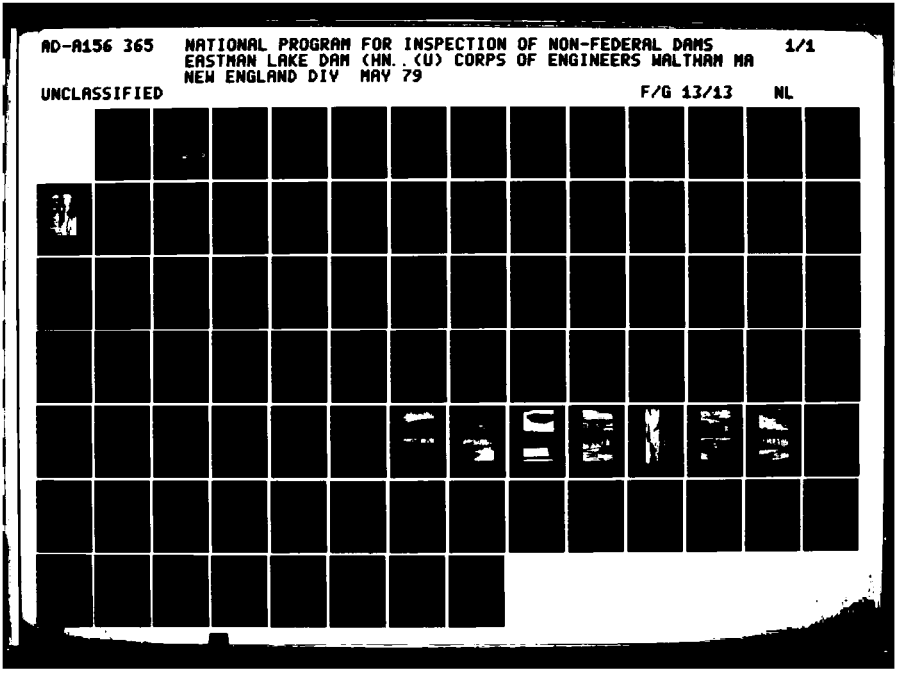
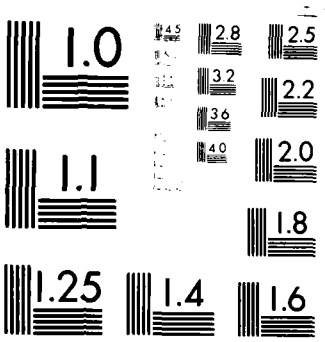
AD-A156 365 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS 1/1
EASTMAN LAKE DAM (HN.. (U) CORPS OF ENGINEERS WALTHAM MA
NEW ENGLAND DIV MAY 79
UNCLASSIFIED F/G 13/13 NL





CONNECTICUT RIVER BASIN

GRANTHAM, NEW HAMPSHIRE

EASTMAN LAKE DAM

NH 00039

NHWRB 97.04

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

MAY 1979

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER NH 00039	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Eastman Lake Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE May 1979 13. NUMBER OF PAGES 55
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Connecticut River Basin
Grantham, New Hampshire
Eastman Brook

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The dam has a maximum height of 45 ft. and is about 415 ft. long. The dam is judged to be in good condition. Two wet patches were observed on the downstream side above the elevation of the permenent pool. The dam is classified as intermediate in size with a hazard potential of high. There is work which must be done on the remaining spillway to assure the continued performance of the dam.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

DISCLAIMER NOTICE

THIS DOCUMENT IS BEST QUALITY PRACTICABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:
NEDED

JUN 29 1979

Honorable Hugh J. Gallen
Governor of the State of New Hampshire
State House
Concord, New Hampshire 03301

Dear Governor Gallen:

I am forwarding to you a copy of the Eastman Lake Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Water Resources Board, the cooperating agency for the State of New Hampshire. In addition, a copy of the report has also been furnished the owner, Controlled Environment Corporation, P.O. Box 1, Grantham, New Hampshire 03753, ATTN: Mr. Jonathan Burnham, Manager.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Water Resources Board for your cooperation in carrying out this program.

Sincerely yours,

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

EASTMAN LAKE DAM

NH 00039

NHWRB 97.04

CONNECTICUT RIVER BASIN
GRANTHAM, NEW HAMPSHIRE

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification No.:	NH 00039
Name of Dam:	Eastman Lake Dam
Town:	Grantham
County and State:	Sullivan, New Hampshire
Stream:	Eastman Brook
Date of Inspection:	June 7, 1978

BRIEF ASSESSMENT

Eastman Lake Dam is an earth dam across the outlet of Eastman Brook in the central western part of New Hampshire about fifteen miles southeast of the city of Lebanon. The dam has a maximum height of 45 feet and is approximately 415 feet long with a 40-foot wide roadway at the top. The principal spillway is a 42-inch diameter concrete pipe which is located at the base of and near the center of the dam. The intake structure is a reinforced concrete riser with a single stage crest. Provision was made in the design for an emergency spillway with a crest length of 50 feet The emergency spillway has been rough graded but not finished.

The dam is judged to be in good condition. Two wet patches were observed on the downstream side above the elevation of the permanent pool. On the upstream seeded slope four minor areas of erosion were observed. Continuance of this classification depends on proper operations and maintenance of the dam.

This dam falls under the category of high hazard potential, and it is intermediate in size. The test flood peak inflow is equal to the probable maximum flood, 15,560 cfs, and the test flood peak outflow is 3,548 cfs. Hydraulic analysis indicates that the surcharge height above the crest of the principal spillway is about 14.9 feet and above the crest of the emergency spillway is about 8.2 feet. The project will pass the test flood peak outflow without overtopping the dam, and therefore the spillway capacity is adequate.

The remaining work on the emergency spillway should be started within one year of receipt of Phase I report by the owner and the following recommended operation and maintenance measures, as stated in Section 7.3, should be implemented within 2 years.

1. The erosion areas on the upstream side should be corrected.

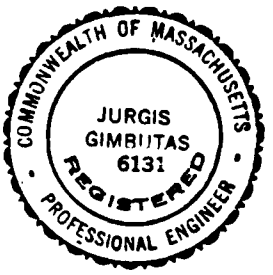
2. The soft patches on the downstream face should be monitored to determine the cause and then corrective measures taken.

3. An operating and maintenance manual for the project be prepared.

4. A program of technical bi-annual periodic inspections of the project features should be prepared and initiated.

5. Surveillance and a warning system be developed for periods of unusually heavy rains and runoff.

FAY, SPOFFORD & THORNDIKE, INC.
By:



Jurgis Gimbutas, P.E.
Project Engineer

Richard W. Albrecht, P.E.
Vice President

This Phase I Inspection Report on Eastman Lake Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

Charles G. Tiersch

CHARLES G. TIERSCH, Chairman
Chief, Foundation and Materials Branch
Engineering Division

Fred J. Ravens Jr

FRED J. RAVENS, Jr., Member
Chief, Design Branch
Engineering Division

Saul Cooper

SAUL COOPER, Member
Chief, Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in Recommended Guidelines for Safety Inspection of Dams, for a Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineer, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

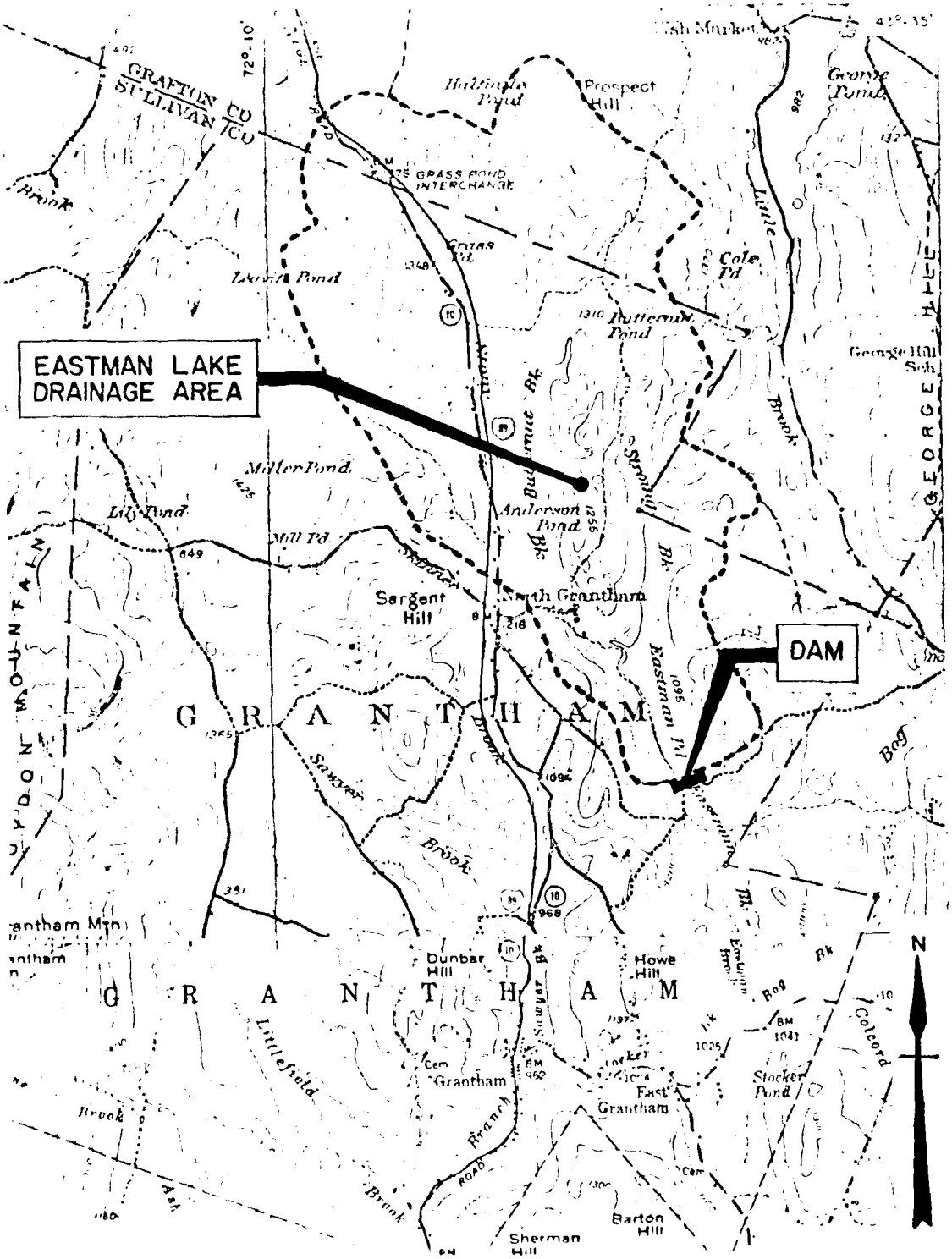
It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonable possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition, and the downstream damage potential.

TABLE OF CONTENTS

OVERVIEW PHOTOGRAPH

EASTMAN LAKE DAM, LOOKING SOUTHWEST
Negative No. 5-26A



SCALE 1:62500 (ACTUAL)

UNITED STATES
DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY

SUNAPEE, N.H. 1955
AMS 6570-I-SERIES V712
MASCOMA, N.H. 1927

EASTMAN LAKE DAM

SECTION 1 - PROJECT INFORMATION

1.1 General

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Fay, Spofford & Thorndike, Inc., Engineers, have been retained by the New England Division to inspect and report on selected dams in the State of New Hampshire. Authorization and notice to proceed was issued to Fay, Spofford & Thorndike, Inc., under a letter of May 3, 1978, from Mr. Ralph T. Garver, Colonel, Corps of Engineers. Contract No. DACW 33-78-C-0308 has been assigned by the Corps of Engineers for this work.

b. Purpose

(1) Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) Encourage and prepare the states to initiate quickly effective dam safety programs for non-Federal dams.

(3) To update, verify, and complete the National Inventory of Dams.

1.2 Description of Project

a. Location

Eastman Pond is located in the central western part of New Hampshire and about 15 miles southeast of the city of Lebanon. Eastman Lake Dam is built on the south end of the lake, which is the outlet of Eastman Brook. This brook flows, via several other brooks, into Sugar River, which is tributary to the Connecticut River. About 2 1/2 miles downstream from the lake and situated on the banks of Stocker Brook, is the village of East Grantham. Another 1/2 mile

downstream, the village of Grantham is located at the confluence of the Stocker and North Branch Brooks. These villages are about 125 feet lower than the crest elevation of the spillway of this dam.

b. Description of Dam

The dam, built in 1972, is a compacted earth embankment dam with a length of 415 feet and a maximum height of 45 feet above the stream bed. The top of the dam is 40 feet wide and accommodates a two-lane paved roadway. It has a 15-foot wide berm on the upstream side which can be used as a mini-transit lane. The slopes are 1 vertical to 2.5 horizontal with riprap slope protection below a 15-foot wide berm on the upstream side (Photographs No. 1, 2, and 4, Appendix C).

The principal spillway is a 42-inch diameter concrete pipe placed at the base of the embankment near the middle length. This pipe is cantilevered at the outlet into a riprap stilling basin (Photograph No. 7, Appendix C).

The intake structure is a reinforced concrete covered riser with a single stage crest (Photographs No. 5 and 6, Appendix C). The reservoir (lake) drain is a 30-inch diameter concrete pipe from the upstream toe to the riser. Flow through this pipe is controlled by a sluice gate mounted inside of the riser.

The emergency spillway is a 50-foot wide earth channel, rough graded, and located east of the dam. This emergency channel joins Eastman Brook about 1,100 feet downstream of the dam (Photographs No. 9, 10, 11, 12, and 13, Appendic C).

c. Size Classification

The storage capacity at the spillway crest is 3,350 acre-feet which falls in the range $\geq$ 1,000 and $<$ 50,000 acre-feet. Therefore, on the basis of Table 1, Size Classification, in the guidelines furnished by the Corps of Engineers, the dam is classified as intermediate in size.

d. Hazard Classification

In the event of failure of this dam, East Grantham, which is at a distance of approximately 2 1/2 miles downstream of the dam, will be in danger of being flooded. Because the flood wave normally does not exceed more than two-thirds the height of the dam and on the basis of engineering judgment, it is estimated that in the event of failure of this dam loss of more than a few lives and excessive property damage would probably occur. Therefore, on the basis of Table 2, Hazard

Potential Classification, in the guidelines furnished by the Corps of Engineers, this dam falls in the category of high hazard potential. The approximate damage impact area is included in Appendix D.

e. Ownership

The owner of the Eastman Lake Dam is the Controlled Environment Corporation, P.O. Box 1, Grantham, New Hampshire 03753, telephone (603) 863-4444. They have initiated and executed the construction of this dam and developed a planned residential community around the lake.

f. Operator

Mr. Jonathan Burnham, Manager, Controlled Environment Corporation, P.O. Box 1, Grantham, New Hampshire 03753, telephone (603) 863-4444.

g. Purpose of Dam

The prime purpose of this dam is for recreation for the residential community located near the lake area. The secondary purpose is flood control of the inhabited valley of Eastman Brook.

h. Design and Construction History

Prior to construction of this dam by the present owner, there was a smaller dam and a bridge over Eastman Brook located north of the present dam. The water elevation of the smaller dam was approximately 1096 with a storage area of about 142 acres. With the new dam in place, the water level of the pond is at crest elevation, 1109.0, of the intake structure, which results in a storage area of approximately 335 acres.

Preliminary topography for the lake shores with a proposed dam at the south end was prepared in September 1971, by Hayes Engineering, Inc., Melrose, Massachusetts. This work was based on topographical plans prepared by the U.S. Department of Agriculture, Soil Conservation Service, with contour intervals of 4 feet.

Haley & Aldrich, Inc., Consulting Soil Engineers of Cambridge, Massachusetts, were engaged to provide engineering services for a new dam, approximately 350 feet south of the existing dam. Subsurface explorations were made from September 3, to October 15, 1971, with soil borings drilled by C. L. Guild Company, Inc., Braintree, Massachusetts. The design drawings, specifications, soils analysis, and other supporting data were submitted for review to the New Hampshire Water Resources Board on January 17, 1972. The design was done

in accordance with the design criteria of the Soil Conservation Service. The Board requested some changes, which were incorporated in the final construction drawings.

Haley & Aldrich, Inc., provided engineering services in the field during construction from May, to September, 1972. As of September 22, 1972, the dam was substantially complete. The emergency spillway remained unfinished as it was rough graded only.

The dam has been functioning satisfactorily since its completion.

i. Normal Operational Procedure

This dam is checked regularly by Mr. Jonathan Burnham, Manager of Controlled Environment Corporation. The only control available to lower the level of the lake is a 30-inch concrete pipe drain regulated by a sluice gate. The sluice gate is manually operated from the top of the riser.

1.3 Pertinent Data

a. Drainage Area

Eastman Pond as shown on the U.S.G.S. Quadrangle Sheet is located on the headwaters of Eastman Brook. It has a total drainage area of 7.5 square miles. The watershed is highly wooded, undulated, and rolling.

b. Discharge at Dam Site

(1) Outlets Works (conduits) -

Size - 30-inch diameter and invert Elevation 1094.0

(2) Maximum known flood at dam site - Flood of September 21-24, 1938. The magnitude is unknown.

(3) Ungated spillway capacity at maximum pool elevation

(a) Principal spillway (42-inch diameter concrete pipe).

257 cfs at 1123.9 Elevation
261 cfs at 1125.0 Elevation (at top of dam)

(b) Emergency Spillway.

3346 cfs at 1123.9 Elevation
4041 cfs at 1125.0 Elevation (at top of dam)

(4) Total Spillway Capacity (Principal and Emergency Spillways) at maximum pool elevation.

3603 cfs at 1123.9 Elevation
4302 cfs at 1125.0 Elevation (at top of dam)

c. Elevation (Feet above MSL)

(1) Top of dam - 1125.0.

(2) Maximum pool elevation caused by the test flood - 1123.9.

(3) Recreation pool - 1109. It is assumed that the recreation pool elevation is the same as the normal conservation level and the spillway crest elevation.

(4) Spillway crest - 1109.

(5) Upstream portal invert diversion tunnel - 1094.0.

(6) Stream bed at centerline of dam - 1090.

(7) Maximum tail water - 1089.0 (estimated).

d. Reservoir

(1) Length of maximum pool - 2 miles (estimated).

(2) Length of recreation pool - 1.6 miles (estimated).

(3) Length of flood control pool - 1.8 miles (estimated).

e. Storage (Acre-Feet)

(1) Recreation pool - 3,350 acre-feet.

(2) Flood control pool - 5,170 acre-feet (estimated).

(3) Design surcharge - 5,675 acre-feet (estimated) at a surcharge elevation of 1115.4 during passage of the Soil Conservation Service emergency spillway hydrograph.

(4) Top of dam - 9,225 acre-feet (estimated).

f. Reservoir Surface (Acres)

(1) Top of dam - 435 acres (estimated).

(2) Maximum pool - 513 acres (estimated).

(3) Flood control pool - 369 acres.

(4) Recreation pool - 335 acres. It is assumed that the recreation pool elevation is the same as the spillway crest elevation.

(5) Spillway crest - 335 acres.

g. Dam

(1)	Type	Earth embankment.
(2)	Length	415 feet.
(3)	Height	45 feet.
(4)	Top width	40 feet.
(5)	Side slopes	1 vertical to 2.5 horizontal.
(6)	Zoning	Essentially, it is a homogeneous type of dam consisting of impervious glacial till. Drawings allowed material having less than 30 per cent finer than No. 200 mesh sieve to be placed in the downstream portion of the dam.
(7)	Impervious core	None.
(8)	Cutoff	Compacted earth, cut-off trench with a minimum width of 12 feet.

h. Intake Structure

(1)	Type	Reinforced concrete riser.
(2)	Length of weir	10.5 feet.
(3)	Crest elevation	1109.
(4)	Gates	None.
(5)	U/S channel	Pond.

i. Emergency Spillway

According to visual observations made on June 6, 1978, this spillway has been rough-graded but not finished. Plans prepared for the construction of this dam indicate the following:

(1)	Type	Vegetated earth channel.
(2)	Dimensions	50 feet wide and approximately 1,100 feet long.
(3)	Crest elevation	1115.7.
(4)	Gate	None.
(5)	U/S channel	Pond.

j. Reservoir Drain

(1)	Invert	1094.0.
(2)	Size	30-inch diameter.
(3)	Description	Concrete pipe.
(4)	Control mechanism	Gate control, manually operated.

SECTION 2 - ENGINEERING DATA

2.1 Design

Drawings indicating plans, elevations, and sections of the dam and appurtenant structures, including the details of the discharge facilities, such as outlet works, and emergency spillways, were obtained from Haley & Aldrich, Inc. Selected drawings are included in Appendix B. The design report which includes the logs of the borings and the design summary sheet was also obtained from Haley & Aldrich, Inc. See Appendix B for detailed listing.

2.2 Construction

a. Concrete Properties

Source, type of aggregate, cement used, mix design data, and result of testing are not available from project records. Available records indicate that Haley & Aldrich, Inc., had full-time representation at the site between May, and September, 1972. Therefore, data pertaining to the concrete properties may be filed in the office of Haley & Aldrich, Inc., Cambridge, Massachusetts.

b. Construction History

(1) Initially during construction, Eastman Brook was diverted into a 10-foot wide riprap channel along the east abutment. After the completion of the reservoir drain, the riser, and the 42-inch conduit, this brook was rediverted into the principal spillway.

(2) Available design drawings have been revised to indicate the modifications made during construction due to field conditions.

(3) Construction sequence, pertinent construction problems, and maintenance repair are not available from project records.

c. Testing

Construction control test are not available from project records. Since there was a representative of Haley & Aldrich, Inc., on the site, these tests were probably performed.

2.3 Operation

Records of operation of this dam and of performance observations are not available.

2.4 Evaluation

a. Availability

Pertinent structural, geotechnical, hydrologic, and hydraulic data, which formed the basis of the design of the dam, are available at the office of Haley & Aldrich, Inc., who designed this dam.

b. Adequacy

Sufficient engineering data are available for a Phase I inspection.

c. Validity

The available engineering data is considered valid on the basis of the results of the visual inspection.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

The Phase I inspection of the Eastman Lake Dam was performed on June 6, 1978. A copy of the inspection check list is included in Appendix A.

a. General

In general, the soil and rock features are in good condition. The concrete structure of this dam was observed to be in good condition, see subparagraph c.

b. Dam

The 40-foot wide paved roadway on the crest is in excellent condition with no visible signs of horizontal or transverse cracks. The wood guardrail is also in good condition with no apparent vertical or horizontal misalignments. The upstream and downstream seeded slopes on each side of the dam are in good condition. The riprap slope protection below the 15-foot wide berm on the upstream side is also in good condition, and there is no indication of sloughing, bulging, or movement of the slopes. No evidence of piping was observed.

Two wet patches were observed on the downstream side approximately 150 feet east of the existing catch basin above the elevation of the permanent pool. These patches were also observed in 1976, by the New Hampshire Water Resources Board.

On the upstream seeded slopes, four areas of erosion, minor in nature, were observed.

c. Appurtenant Structures

At the time of our inspection, the water level was at Elevation 1109 msl. The concrete of the riser above the reservoir water surface was observed to be in excellent condition. The sluice gate in the riser controlling flow through the 30-inch reservoir (lake) drain is in operable condition. The 42-inch diameter outlet pipe is in excellent condition. The joint alignment is generally good. No erosion was noted. The wooden footbridge over the outlet channel, approximately 20 feet from the outlet structure, is in good condition. The wooden railings on either side of the bridge are also in good condition. It appears that this bridge was built for scenic reasons and will not impede the flow in the channel.

The inspection indicated that the emergency spillway has not been completed; and the existing alignment is offset, approximately 25 feet, at the roadway crossing. Along the east side of the spillway there is a sewer line which terminates at a treatment plant that contains lagoons. The channel of this spillway is being used as a construction roadway and, therefore, the channel and its side slopes have not been seeded. This situation was also observed in 1976, by the New Hampshire Water Resources Board. In this report, the inspecting engineer stated the following: "If spillway used, there would be a tremendous amount of silt going downstream, needless to say what would happen to the sewer line."

Field observation indicates that the lake level is controlled by the intake structure, concrete riser. The only control available to lower the level of the lake is the 30-inch drain.

d. Reservoir Area

Eastman Pond is at the head of Eastman Brook and south of North Grantham, which is located near the west shore of the pond.

Eastman Pond has an area of 335 acres at Elevation 1109. There is a planned residential area and some cottages around the pond. The shoreline is heavily wooded.

e. Downstream Channel

The downstream channel and side slopes are in good condition.

Debris was observed in this channel. The quantity of debris is small and will not impede the flow in the channel.

3.2 Evaluation

The observed condition of the dam is good. The potential problems observed during the visual inspection are:

a. Unfinished emergency spillway.

b. Two soft spots on the downstream face.

c. Erosion areas on the upstream slope.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 Procedures

The Controlled Environment Corporation has operated the Eastman Lake Dam since it was constructed in 1972. The lake level is controlled by the intake structure which is a reinforced concrete riser with a single stage crest. The only control available to lower the level of the lake is a 30 inch concrete pipe drain which connects to a concrete riser. The flow through the drain is regulated by a sluice gate manually operated from the top of the riser.

4.2 Maintenance of Dam

The maintenance of Eastman Lake Dam is the responsibility of the Controlled Environment Corporation.

4.3 Maintenance of Operating Facilities

No written maintenance procedures were disclosed for Eastman Lake Dam.

The maintenance of the manually operated gate controlling flow in the 30-inch diameter reservoir drain is good.

4.4 Description of any Warning System in Effect

A flood warning system is non-existent.

4.5 Evaluation

The current operation and maintenance procedures for Eastman Lake Dam are on ad hoc basis.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design Data

(1) This dam falls under the category of high hazard potential, and it is intermediate in size. Using the "Recommended Guidelines for Safety Inspection of Dams," the recommended spillway test flood peak inflow is equal to the probable maximum flood. The spillway test flood inflow hydrograph, estimated, is furnished in Appendix D. The spillway test inflow flood peak is 15,560 cfs.

(2) The computed peak outflow is 3,548 cfs, corresponding to the routed spillway test flood peak inflow. Refer to Appendix D for details.

(3) The lake storage capacity versus the elevation, an estimated capacity curve, is included in Appendix D.

(4) The estimated composite discharge rating curve for the principal spillway and emergency spillway is furnished in Appendix D.

(5) The hydrologic map of the watershed above the dam site, including reservoir area, watercourse, is furnished in Appendix D.

b. Experience Data

This dam has not been exposed to any unusual floods.

c. Visual Observations

The crest of the earth dam is 9.1 feet above the crest of the emergency spillway or 16 feet above the crest of the principal spillway. The hydraulic design of the principal spillway is good. The outlet of the principal spillway cantilevers into a stilling basin at the toe of the dam. The emergency spillway has been rough-graded but not finished at the time of the inspection. It must be noted here that the New Hampshire Water Resources Board has taken a serious view of the lapse on the part of the owner for not carrying out all the requirements of the construction permit.

d. Overtopping Potential

The spillway test flood peak inflow is 15,560 cfs. When this test flood is routed by an approximate method through the lake, it is found that the maximum surcharge water surface elevation in the lake would be 1123.9. Therefore, the earth dam will not be overtopped. Surcharge height above the crest of the principal spillway would be about 14.9 feet, and the surcharge height above the crest of the emergency spillway would be 8.2 feet.

SECTION 6 - STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

The upstream slope could not be seen due to the fact that it was underwater. The slopes of the embankment do not show any weak areas. The visual inspection revealed no evidence of stability problems.

b. Design and Construction Data

Design drawings and the design report for this project were obtained from project records. These drawings have been revised by the design engineer to indicate modifications made due to field conditions. The design report indicates that stability analysis for sudden drawdown and long-term condition was performed by the Design Engineer. The design report contained no computations but listed the minimum factor of safety of 2.5.

c. Operating Records

Except for memorandums and correspondence listed in Appendix B, other records are not available.

d. Post-Construction Changes

Available records indicate that this dam has not been modified since its construction.

e. Seismic Stability

The dam is located in Seismic Zone 2 and, in accordance with the recommended Phase I guidelines, does not warrant seismic analyses

SECTION 7 - ASSESSMENT, RECOMMENDATIONS & REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition

Examination of available documents and visual inspection of Eastman Lake Dam and its appurtenant structures did not reveal any defects which would render the project inadequate from the standpoint of structural stability and the dam is judged to be in good condition.

b. Adequacy of Information

An adequate assessment of the dam consistent with the scope of a Phase I investigation has been made based upon the visual inspection and available information.

c. Urgency

The remaining work on the emergency spillway should be started within one year of receipt of Phase I report by the owner and the operational and maintenance measures, enumerated in Section 7.3 below, should be implemented within 2 years.

d. Need for Additional Investigation

At this time, there are no problems which would require additional investigation.

7.2 Recommendations

No major modification or engineering investigation is recommended at this time.

7.3 Remedial Measures

Although the dam is generally maintained in good condition, it is considered important that the following operating and maintenance procedures be attended to as early as practical:

a. The emergency spillway should be completed as per approved plans and specifications.

b. Erosion areas on the upstream slope should be corrected as continued erosion could develop into a serious problem.

c. The two soft patches on the downstream face should be monitored and the cause should be explored for correction.

d. An operating and maintenance manual for the project should be prepared.

e. A program of technical bi-annual periodic inspection of the project feature should be prepared and initiated.

f. As the dam is upstream of a populated area, round-the-clock surveillance should be provided during periods of high precipitation.

g. The owner should develop a formal warning system. An operational procedure to follow in the event of an emergency should also be adopted.

7.4 Alternatives

None recommended.

APPENDIX A

VISUAL INSPECTION CHECK LISTS

APPENDIX A

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Eastman Lake Dam DATE June 7, 1978

TIME 830 - 1200

WEATHER Sunny

W.S. ELEV. 1109 U.S. DN.S.

PARTY:

1. Jurgis Gimbutas, P.E.	Team Captain - Structural and Concrete
2. Harvey H. Stoller, P.E.	Soils, Geology, & Foundations
3. V. Rao Maddineni, P.E.	Hydraulics & Hydrology

PROJECT FEATURE	INSPECTED BY	REMARKS
1. Dam Embankment	H. H. Stoller	Good
2. Intake Channel	H. H. Stoller V. R. Maddineni	Good
3. Intake Structure - Riser	J. Gimbutas	Excellent
4. Outlet Works - Conduit	J. Gimbutas	Excellent
5. Outlet Channel	H. H. Stoller V. R. Maddineni	Good
6. Pond and Downstream Channel	V. R. Maddineni	Good

PERIODIC INSPECTION CHECK LIST

PROJECT Eastman Lake Dam DATE June 7, 1978

PROJECT FEATURE Dam Embankment

DISCIPLINE Soils & Foundations NAME

PROJECT FEATURE

DISCIPLINE NAME

DISCIPLINE NAME

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	1125.0 msl
Current Pool Elevation	1109 msl
Maximum Impoundment to Date	1110.8 msl
Surface Cracks	None observed
Pavement Condition	Excellent
Movement or Settlement of Crest	None observed
Lateral Movement	None observed
Vertical Alignment	No visual vertical misalignment observed
Horizontal Alignment	No visual horizontal misalignment observed
Condition at Abutment and at Concrete Structures	Good

PERIODIC INSPECTION CHECK LIST

PROJECT Eastman Lake Dam DATE June 7, 1978

PROJECT FEATURE Dam Embankment

DISCIPLINE Soils & Foundations NAME [signature]

PROJECT FEATURE _____

DISCIPLINE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
Indications of Movement of Structural Items on Slopes	None observed
Trespassing on Slopes	None observed
Sloughing or Erosion of Slopes or Abutments	Minor erosion (see narrative)
Rock Slope Protection - Riprap Failures	Good condition
Unusual Movement or Cracking at or Near Toes	None
Unusual Embankment or Downstream Seepage	None (see narrative)
Piping or Boils	None observed
Foundation Drainage Features	Could not be observed
Toe Drains	None
Instrumentation System	None

PERIODIC INSPECTION CHECK LIST

PROJECT Eastman Lake Dam DATE June 7, 1978

PROJECT FEATURE Riser

DISCIPLINE Structures NAME

PROJECT FEATURE Intake Channel

DISCIPLINE Soils & Foundations NAME

DISCIPLINE Hydraulics & Hydrology NAME

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE (RISER)	
a. Intake Channel	
Slope Conditions	Slopes above water level in good condition
Bottom Conditions	Could not be observed
Rock Slides or Falls	None observed above water line
Log Boom	None
Debris	None observed
b. Intake Structure (Riser)	
Condition of Concrete	Excellent
Stop Logs and Slots	None

PERIODIC INSPECTION CHECK LIST

PROJECT Eastman Lake Dam DATE June 7, 1978

PROJECT FEATURE Conduit

DISCIPLINE Structures NAME

PROJECT FEATURE Outlet Channel

DISCIPLINE Soils & Foundations NAME

DISCIPLINE Hydraulics & Hydrology NAME

AREA EVALUATED	CONDITION
OUTLET WORKS - CONDUIT	
Size	42-inch concrete pipe
General Condition of Concrete	Excellent
Erosion or Cavitation	None observed
Outlet Channel	
Loose Rock or Trees Overhanging Channel	None observed
Condition of Discharge Channel	Good

APPENDIX B

EXISTING AVAILABLE INFORMATION

APPENDIX B

1. Listing of Design, Construction, and Maintenance Records:

Haley & Aldrich, Inc., 238 Main Street, Cambridge, Massachusetts, have the tracings of their design drawings dated January 14, 1972 to March 9, 1972. There are twelve sheets, including Sheet 6A.

The general title of the drawings, design report, and specifications listed above is: Controlled Environment Corporation, Grantham, New Hampshire, Eastman Lake Dam.

These drawings show the dam site plan, principal spillway, dam section with cutoff trench and drainage blanket, emergency spillway, riser and gate house details, conduit details, cradle and bent details. Reservoir Drain Sheets 1 to 6, 7, 10, and 11 have revisions (construction notes) dated September 22, 1972. The revision for Sheet 6A is dated March 9, 1972. Haley & Aldrich, Inc., file number is 2786.

Three sets of blueprints of the above drawings are filed at the New Hampshire Water Resources Board in Concord, New Hampshire.

Haley & Aldrich, Inc., and the New Hampshire Water Resources Board also have the design report, dated January 17, 1972, which contains the design data, foundation and soils data, and project specifications; all of which are found in two books.

Other records filed at the New Hampshire Water Resources Board are:

(1) Eastman Pond topographical plan, dated September 22, 1971, showing the old existing dam, and the proposed dam, made by Hayes Engineering, Inc., 828 Lynn Fells Parkway, Melrose, Massachusetts.

Note: A copy of this plan is also included with the Haley & Aldrich, Inc., design report of 1972.

(2) February 18, to December 12, 1972. Exchange of letters between Mr. Donald M. Rapoza, Water Resources Engineer, New Hampshire Water Resources Board, and Mr. Peter L. LeCount, P.E., of Haley & Aldrich, Inc., containing various design changes and additions, and finishing up the construction.

Note: These changes are added to the design drawings and revisions.

(3) July 8, 1976. Memorandum from Mr. Vernon A. Knowlton, Water Resources Engineer, to the Board of Directors, New Hampshire Water Resources Board. This memorandum explains the potentially dangerous situation since the owner of the dam had not completed the construction of the emergency spillway. It recommends that the spillway be completed during the summer of 1976.

2. Copies of Past Inspection Reports Included Are:

July 2, 1976, by Mr. Donald M. Rapoza, New Hampshire Water Resources Board (four pages).

3. Drawings included with this appendix are the following sheets selected from the design plans made by Haley & Aldrich, Inc., in 1972:

Sheet No. 1. Dam Site Plan, including General Notes.

Sheet No. 2. Principal Spillway and Dam Section.

Sheet No. 3. Cutoff Trench and Drainage Blanket.

Sheet No. 4. Emergency Spillway Alignment and Details.

NEW HAMPSHIRE WATER RESOURCES BOARD

INSPECTION REPORT

Town: GRANTHAM Dam Number: 27 04

Name of Dam, Stream and/or Water Body: EASTMAN LAKE

Owner: CONTROLLED ENVIRONMENT CORP Telephone Number:

Mailing Address: 106 ELM STREET, MANCHESTER NH

Max. Height of Dam: 40 FT. Pond Area: 335 ACRES Length of Dam: 415 FT.

FOUNDATION: BAM FOUNDED ON SOIL (SEE PLANS)

OUTLET WORKS: PIPE (PRINCIPAL) SPILLWAY DISCHARGING INTO RIPRAPED STILLING BASIN. OUTLET WORKS EXCELLENT CONDITION

ABUTMENTS: STRUCTURE BUTTS NATURAL EARTH ON BOTH ENDS.

EMBANKMENT: EARTH EMBANKMENT WITH NARROW TRANSIT LANE ON UPSTREAM SIDE OF EMBANKMENT. ONE VERY SMALL SEEP AREA WAS FOUND IN THE DOWNSTREAM SIDE OF THE EMBANKMENT AT THE RIGHT ABUTMENT. *

Note: Give Sizing, Condition and detailed description for each item, if applicable.

Dam No. 77.04

SPILLWAY: Length: SEE PLANS Freeboard: _____

SEEPAGE: Location, estimated quantity, etc.

SEE COMMENT ON

Changes Since Construction or Last Inspection:

NONE

Tail Water Conditions:

NORMAL STREAM FLOW THROUGH STILLING BASIN

Overall Condition of Dam: DAM EXCELLENT, EMERGENCY SPILLWAY POOR

Contact With Owner: L'C

Date of Inspection: JUNE 25, 1976 Suggested Reinspection Date AFTER ES CONDITIONS RECTIFIED

Class of Dam: NON-ACE CLASS C

Signature Donald M. Pyne

Date JULY 2, 1976

EMERGENCY SPILLWAY: SEE #2 IN COMMENT SHEET

Dam No. 77.04

COMMENTS:

*1 THIS PIPE MAY BE ABOVE THE LEVEL OF THE PERMANENT POOL. MAY BE SEEPAGE FROM EMBANKMENT OR LEAKS FROM SEWER LINE. SPW TWO CORRUGATIONS AT TOE OF EMBANKMENT DISCHARGED INTO ROCK RIPRAP. SHOULD BE REMOVED BEFORE THEY CAUSE ANY DAMAGE TO THE EMBANKMENT.

*2 THE EMERGENCY SPILLWAY IS NOT COMPLETED AND THE EXISTING ALIGNMENT IS OFFSET APPROXIMATELY 25 FEET AT THE ROADWAY CROSSING THERE ARE POCKETS OF WATER STANDING IN THE E.S. THE ES IS RELOCATED AS A SERVICE ROAD. AT VEGETATION AT END OF E.S. AT SEWER LINE RUNNING THE LENGTH OF SPILLWAY. IF SPILLWAY USED THERE WOULD BE A TREMENDOUS AMOUNT OF SILT GOING OVER SPILLWAY. APPLIED TO SPY WHAT WOULD HAPPEN TO THE SEWER LINE.

REC

RECOMMENDATIONS.

1. HAVE THE SCS EVALUATE THE DISCHARGE CAPACITY OF SPILLWAY WITH EXISTING ALIGNMENT

2. REQUIRE OWNER TO ~~[illegible]~~ CONSTRUCT ES ACCORDING TO APPROVED PLANS IF DISCHARGE CAPACITY WILL BE REDUCED BY EXISTING ALIGNMENT.

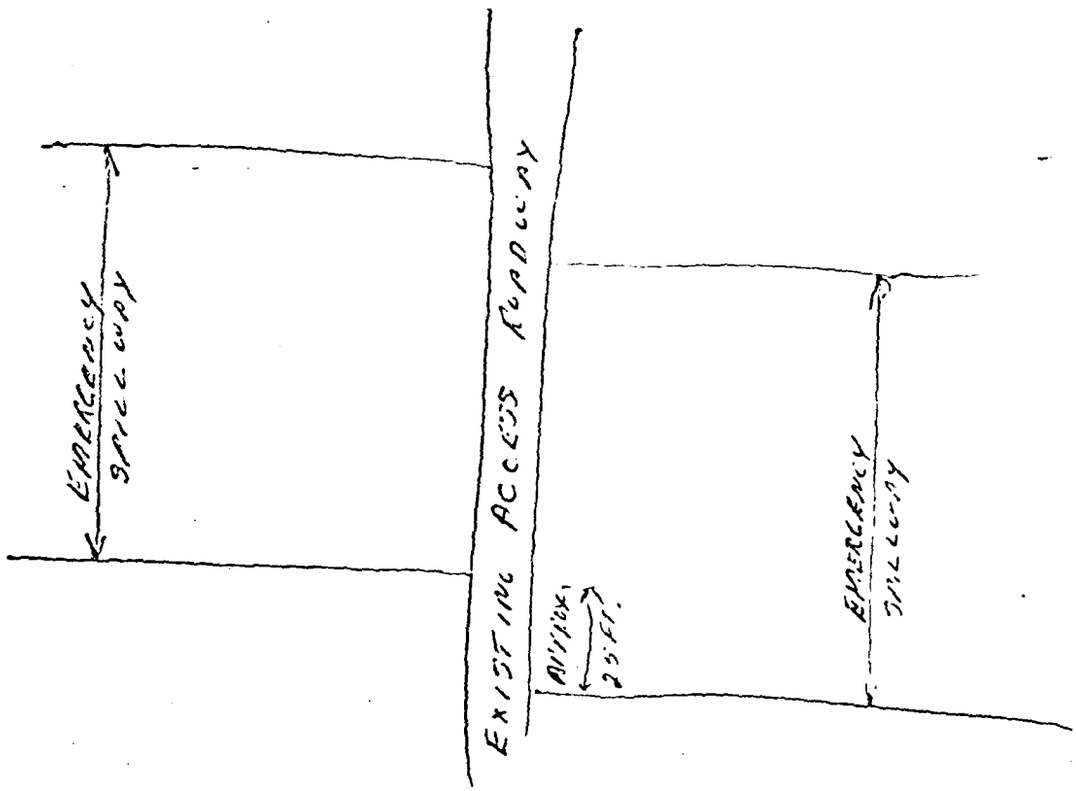
D-5

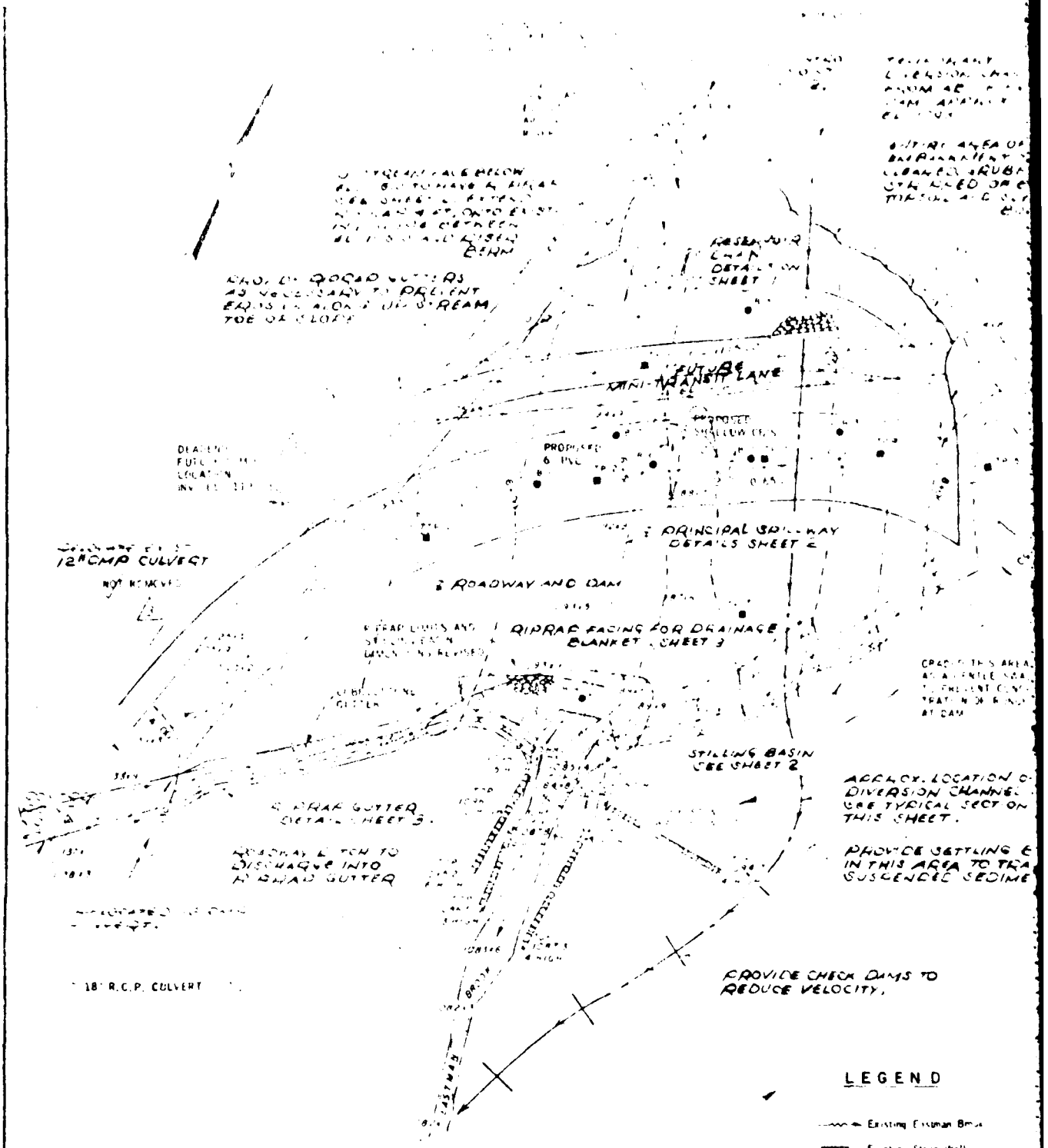
[illegible] AT END OF SPILLWAY

Dam No. 47.64

SKETCH OF DAM (Show Plan, Elevation & Cross Sections)

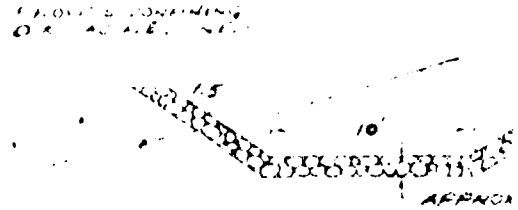
SEE PLANS IN FILE





CONSTRUCTION NOTES

1. Layout and construction measurements by Hayes Engineering, Inc., Melrose, Massachusetts.
2. Haley & Aldrich, Inc. field representative assigned to project from 12 May 1972 to 22 September 1972.



TYPICAL SECTION
DIVERSION CHANNEL
SCALE 1"=4'

NOTES ON TEMPORARY STREAM

1. [illegible] to be mixed with [illegible] and to [illegible] size which can be incorporated into layer
2. [illegible] Dams and Settling Basin to be provided as [illegible] where problems arise
3. Relocate stream into Principal Spillway foundation, 42" dia. conduit, bottom [illegible] River and Re
4. Following recovery of [illegible] remove channel lining, earth and gravel material from channel excavation within
5. Begin [illegible] channel excavation with [illegible] upstream [illegible] completion of outlet.
   Within dam area flatten excavation slopes to 3 horiz. to 1 vert. before backfilling

GENERAL NOTES

1. Subsurface explorations made between [illegible] and 15 [illegible]. Logs of explorations, soil profiles and [illegible] are available at the office of the Engineer. Locations of [illegible] are shown on Sheet 3. Locations of emergency spillway and borrow area explorations are shown on Sheet 4.
2. Project design and construction materials and [illegible] conform to criteria established by the U.S. Department of Agriculture, Soil Conservation Service. Applicable Soil Conservation Service standards and specifications in effect at the time of construction of [illegible] shall govern.
3. Survey control and topography by others.
4. Embankment materials to be obtained from [illegible] excavations shown on Sheet 4. Alternative borrow areas subject to prior testing and approval of the materials by the Engineer, and to the acceptability of the materials as determined by [illegible]
5. Bedding material and drainage fill to be [illegible] source subject to conformance with the material specifications and gradation requirements.
6. Principal spillway conduit to be AWWA C-[illegible] reinforced concrete pipe designed for
   a. Min. 3-edge bearing strength for
      0.001 in. crack 12,000 lb/lin ft. [illegible] 4 ft. of conduit might project outlet may have min. 3-edge bearing strength of 1,500 lb/lin ft.
   b. Max. pressure head 20 ft.
   c. Min. pressure head 0 ft.
7. Cement for concrete shall be Type I or Type II where not otherwise indicated. Concrete shall be Class 4000.
8. Rock riprap may be "equipment-placed" material to be obtained from off site source and or by separating acceptable oversize rock from stripping or embankment material. Boulders may be hand placed to meet maximum size requirement. Completed riprap to be well-graded without segregation.
9. Topsoiling, fertilizing, liming and seeding to meet requirements for overall project development. Seed for dam and emergency spillway areas to be blended of predominantly perennial grasses for permanent vegetative cover. Mulch and or matting to be used on all slopes and areas subject to erosive water flow, in order to effectively prevent erosion until growth is fully established.
10. Riser is a section not according to Soil Conservation Service standard drawing

LEGEND

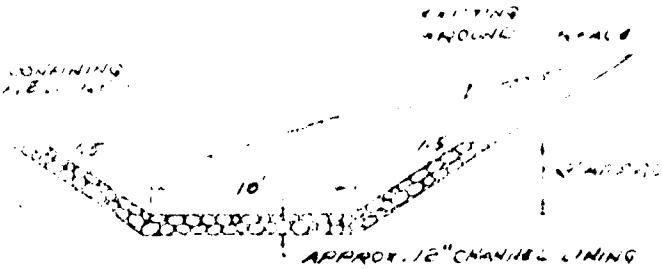
- Existing Eastman Brook
- Existing Stone Wall
- Existing ground surface spot elevation
- Existing ground surface contour
- 2½" dia. test boring location
- Machine-excavated test pit location

SHEET NO

1
2
3
4
5-7
8
9
10
11

NUMBER

CONTI



TYPICAL SECTION
DIVERSION CHANNEL
SCALE 1"=4'

INSTALL CATCHBASIN TO INTERCEPT ROADWAY DITCH; CONDUCT WATER TO DOWNSTREAM RIPRAP GUTTER

ROADWAY DITCH TO DISCHARGE INTO RIPRAP GUTTER

NOTES ON TEMPORARY STREAM DIVERSION

1. Diversion Channel to be lined with cobbles and boulders 3" min. size to max. size which can be incorporated into layer.
2. Check Dams and Settling Basin to be provided as required to reduce velocities where gradients are high.
3. Redirect stream into Principal Spillway following completion of Stilling Basin, 42" dia. conduit, bottom of Riser and Reservoir Drain System.
4. Following redirection, remove channel lining, earth dike and all soft and wet material from channel excavation within Embankment area.
5. Backfill channel excavation with embankment material following completion of cutoff.
   Within Dam area flatten excavation slopes to 3 horiz. to 1 vert. before backfilling.

GENERAL NOTES

1. Subsurface explorations made between [illegible] logs of explorations, soil profiles and test [illegible] from the Engineer. Locations of borings, test pits, test excavations, emergency spillway and cutoff trench are shown on sheet 4.
2. Project design and construction materials and procedures shall conform to standards established by the U.S. Department of Agriculture, Natural Resources Conservation Service, Soil Conservation Service Standard and Specifications for Ponds and Reservoirs (SCS-378) and Standard and Specifications for Structures (SCS-210).
3. Survey control and layout to be performed by others.
4. Embankment materials to be obtained from required excavations in borrow areas and excavations shown on sheet 4. Alternate borrow areas may be used subject to prior testing and approval of the materials by the Engineer. Acceptability of the materials as defined in the specifications.
5. Bedding material and drain fill to be obtained from [illegible] subject to conformance with the material specifications and gradation requirements.
6. Principal spillway conduit to be AWWA C 3 [illegible] reinforced concrete circular pipe designed for
   a. Min. 3-edge bearing strength for 0.001 in. crack = 12,000 lb. per [illegible] outlet may have min. 3-edge bearing strength [illegible]
   b. Max. pressure head = 20.0 ft.
   c. Min. pressure head = 0 ft.
7. Cement for concrete shall be Type [illegible] where not otherwise indicated concrete shall be Class 4000.
8. Rock riprap may be "equipment-placed" material to be obtained from [illegible] source and or by separating acceptable rocks from stripping or [illegible] embankment material. Boulders may be broken at place of use to maximum size requirement. Completed riprap to be well graded and [illegible]
9. Topsoiling, fertilizing, liming and seeding to meet requirements of the overall project development. Seed for dam and emergency spillway areas shall consist of predominantly perennial grasses for permanent vegetative cover. Mulching and matting to be used on all slopes and areas where [illegible] order to effectively prevent erosion and [illegible]
10. Riser top section not according to Soil Conservation Service standard drawing.

INDEX

NUMBER	DATE	DESCRIPTION
3	3/1/72	SUBSURFACE EXPLORATION DATA
2	3/1/72	[illegible] DELETION
1	2/3/72	CHANGE TO SCS [illegible] STANDARD

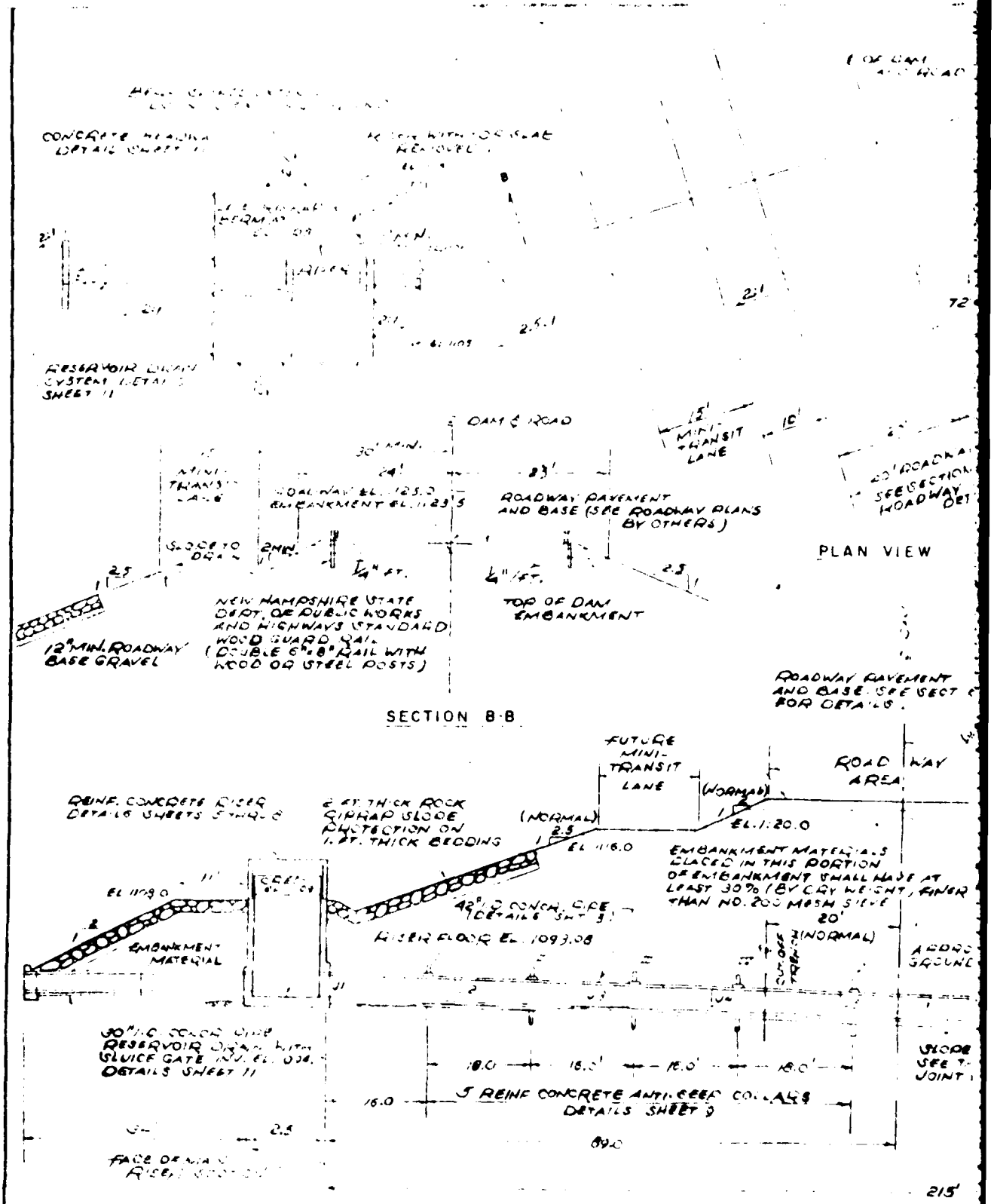
REVISIONS

CONTROLLED ENVIRONMENT CORPORATION
GRANTHAM, NEW HAMPSHIRE

EASTMAN LAKE DAM
DAM SITE PLAN

HALEY & ALDRICH, INC
CONSULTING SOIL ENGINEERS
CAMBRIDGE, MASSACHUSETTS

DRAWN BY	CHECKED BY	APPROVED BY
RM	GRB	PLL
DATE	SCALE	SHEET NO
11/11/72	1" = 30'	1



EMBANKMENT FILL REQUIREMENTS

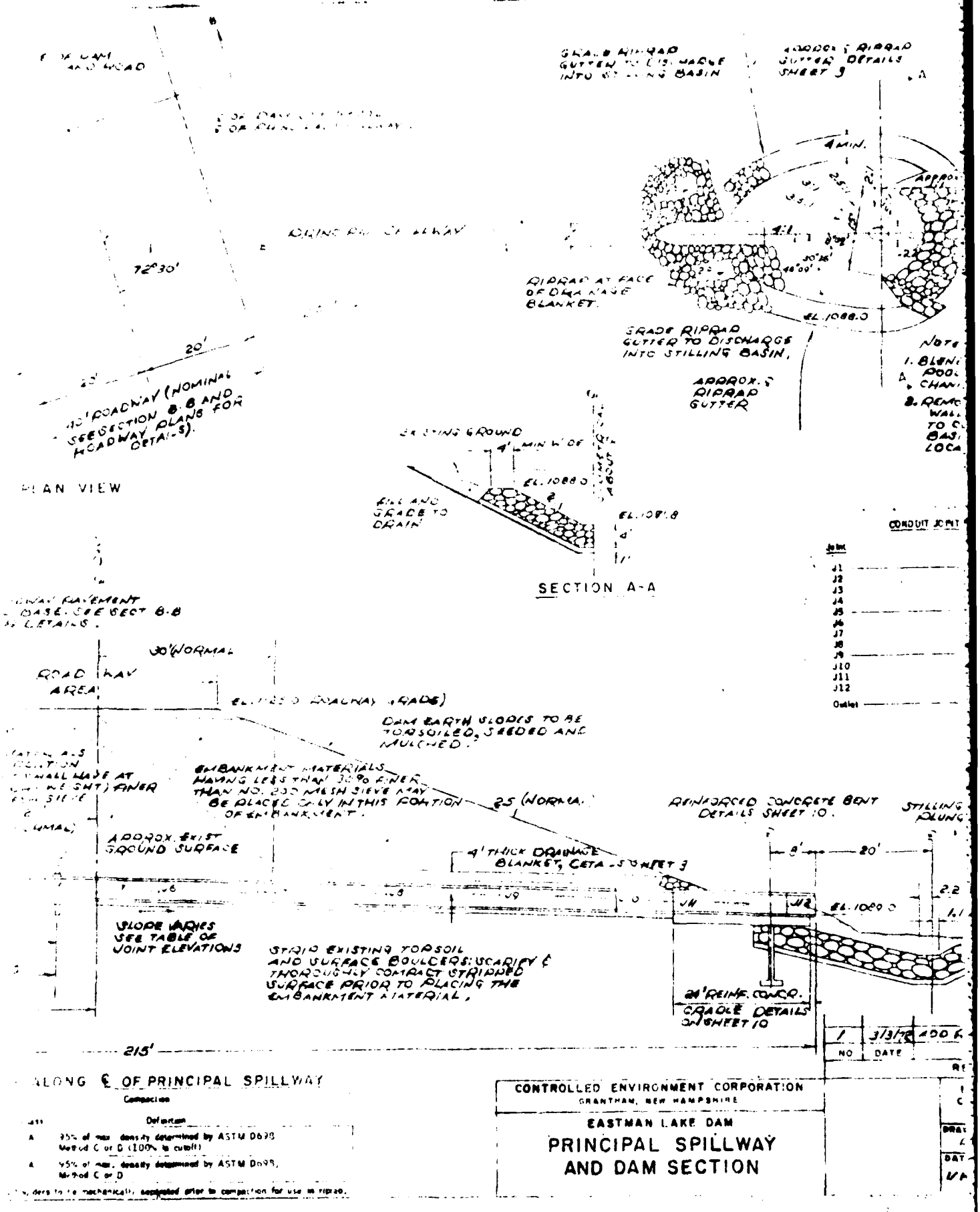
Zone	Material	Max. Rock Size	Max. Lift Loose Measure	Required Water Content	Class	Compaction Data
Main dam and cutoff	Clayey or silty coarse to fine sand [illegible] SC [illegible] represented by material in Boring but also [illegible] 1, 8 & 12	6" (6" in cutoff)	10" (8" in cutoff)	0% to +3% of optimum	A	95% of max. density det. Method C or D 2.0% b
Downstream slope	Material above or [illegible] represented by material [illegible] 13, 14, 15 & 16	8"	10"	0% to +3% of optimum	A	95% of max. density de Method C or D

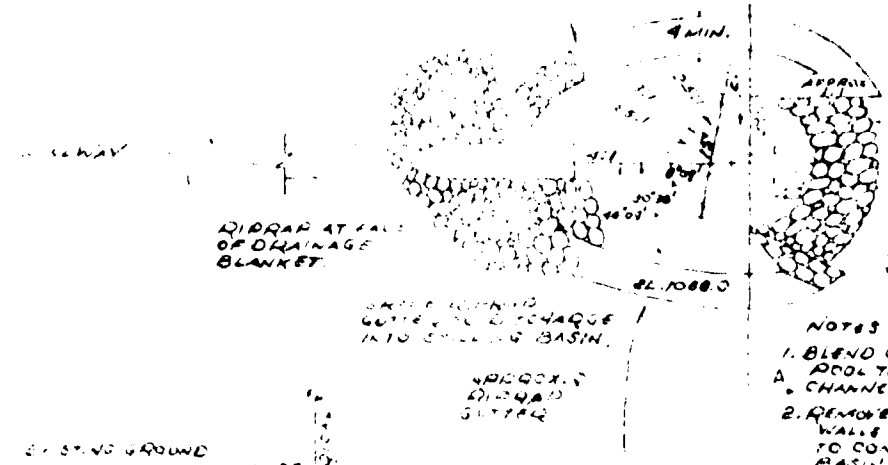
Note: Oversize cobbles and boulders to be [illegible] compact

HALEY & ALDRICH IN

FILE NO. 2788

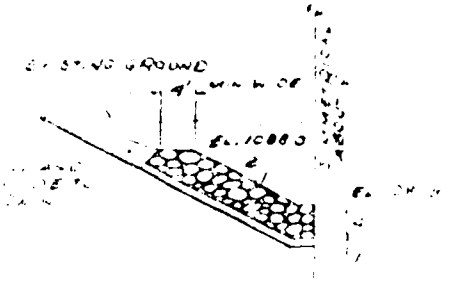
REVISED AS OF 1/31/1985


GRADE RIPRAP GUTTER TO DISCHARGE INTO STILLING BASIN
ADDOOL'S RIPRAP GUTTER DETAILS SHEET 3
4 MIN.
RIPRAP AT FACE OF DRAINAGE BLANKET.
EL. 1088.0
GRADE RIPRAP GUTTER TO DISCHARGE INTO STILLING BASIN.
APPROX. 5' RIPRAP GUTTER
72°30'
20'
22'
30' ROADWAY (NOMINAL SEE SECTION B-B AND ROADWAY PLANS FOR DETAILS).
PLAN VIEW
EXISTING GROUND
4' MIN. W. OF
EL. 1088.0
FILL AND GRADE TO DRAIN
EL. 1078.8
SECTION A-A
CONDUIT JOINT
Joint
J1
J2
J3
J4
J5
J6
J7
J8
J9
J10
J11
J12
Outlet
30' NORMAL ROAD WAY AREA
DAM EARTH SLOPES TO BE TOPSOILED, SEEDED AND MULCHED.
EMBANKMENT MATERIALS HAVING LESS THAN 30% FINER THAN NO. 200 MESH SIEVE MAY BE PLACED ONLY IN THIS PORTION OF EMBANKMENT.
2.5 (NORMAL)
REINFORCED CONCRETE BENT DETAILS SHEET 10.
STILLING
APPROX. EXIST. GROUND SURFACE
4' THICK DRAINAGE BLANKET, DETAILS SHEET 3
8'
20'
2.2
1.1
EL. 1080.0
SLOPE VARIES SEE TABLE OF JOINT ELEVATIONS
STRIP EXISTING TOPSOIL AND SURFACE BOULDERS; SCARIFY & THOROUGHLY COMPACT STRIPPED SURFACE PRIOR TO PLACING THE EMBANKMENT MATERIAL.
24' REINF. CONC. CRADLE DETAILS ON SHEET 10
215'
ALONG ℄ OF PRINCIPAL SPILLWAY
Compaction
Location
Definition
A 95% of max. density determined by ASTM D698 Method C or D (100% to cutoff)
A 95% of max. density determined by ASTM D698, Method C or D
1 3/3/72 ADD F
NO DATE
CONTROLLED ENVIRONMENT CORPORATION
GRANTHAM, NEW HAMPSHIRE
EASTMAN LAKE DAM
PRINCIPAL SPILLWAY AND DAM SECTION



NOTES:

1. BLEND OUTLET OF PLUNGE POOL TO EXISTING STREAM CHANNEL.
2. REMOVE EXISTING STONE WALLS ONLY AS NECESSARY TO CONSTRUCT STILLING BASIN (SEE SHEET 1 FOR LOCATION OF WALLS).

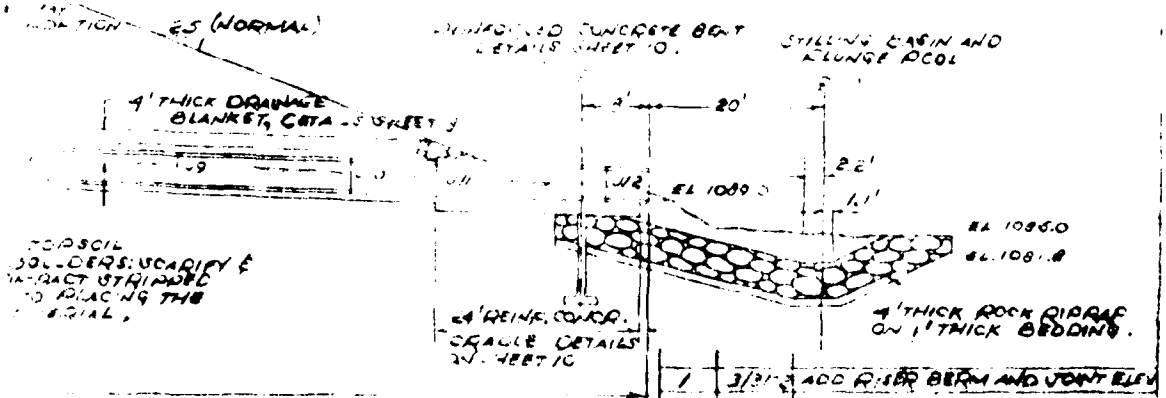


SECTION A-A

CONDUIT INVERT ELEVATIONS

Joint	Invert of 42 in. Dia. R.C.P.
J1	1093.08
J2	1093.01
J3	1093.03
J4	1092.89
J5	1092.63
J6	1092.28
J7	1091.84
J8	1091.28
J9	1090.67
J10	1090.06
J11	1089.76
J12	1089.15
Outlet	1089.00

EARTH SLOPES TO BE ... SEEDED AND MULCHED.



NO	DATE	REVISION
1	3/31/72	ADD RISER BERM AND JOINT ELEV.

CONTROLLED ENVIRONMENT CORPORATION
GRANTHAM, NEW HAMPSHIRE

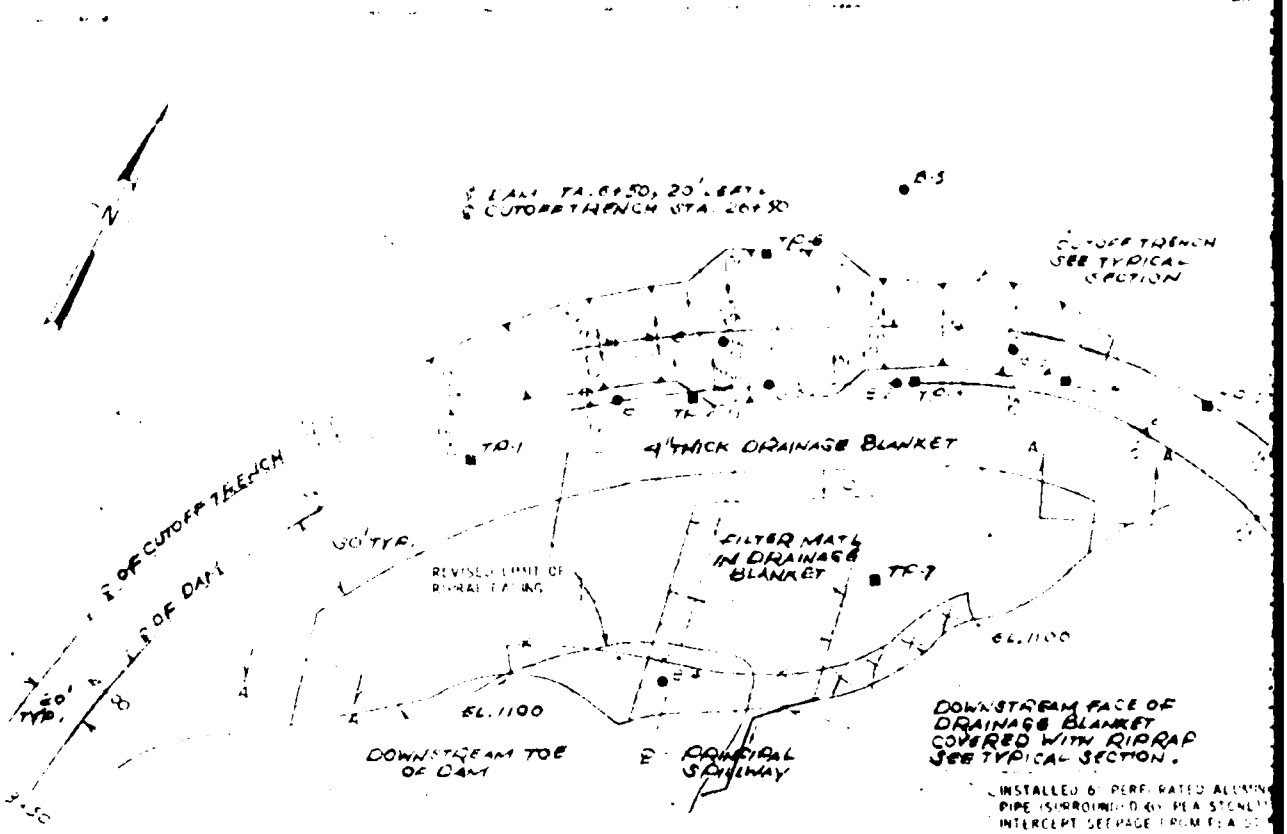
EASTMAN LAKE DAM

PRINCIPAL SPILLWAY AND DAM SECTION

HALEY & ALDRICH, INC.
CONSULTING SOIL ENGINEERS
CAMBRIDGE, MASSACHUSETTS

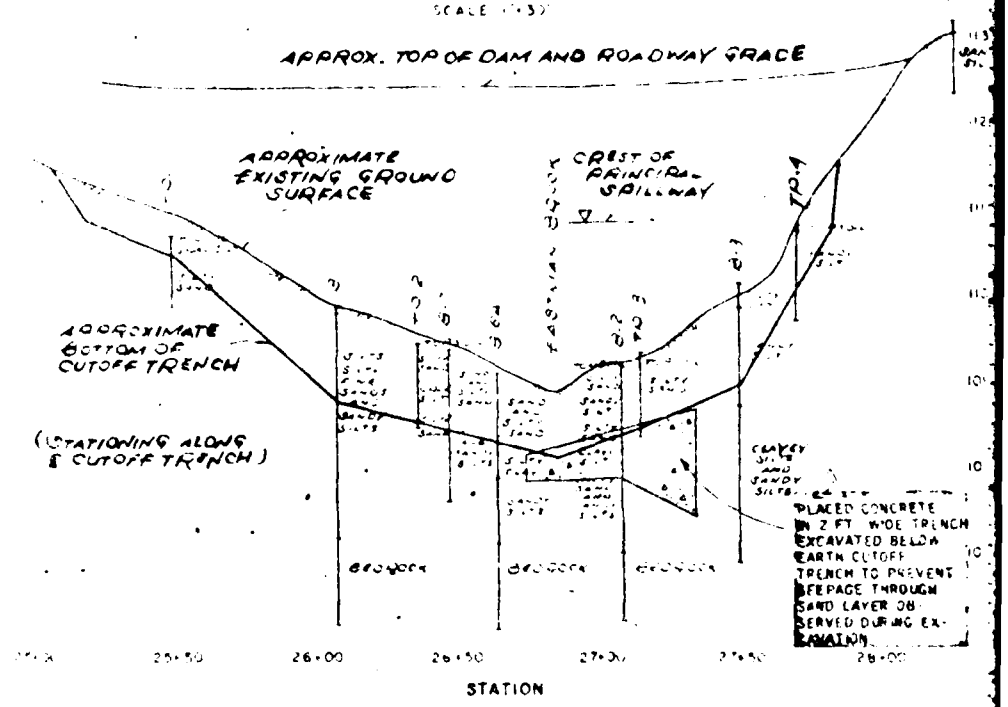
DRAWN BY	CHECKED BY	APPROVED BY
JV	GRB	DLL

DATE	SCALE	SHEET NO
6/14/72	1" = 10'	2



PLAN VIEW OF CUTOFF TRENCH AND DRAINAGE BLANKET

SCALE 1"=50'



PROFILE ALONG ℄ OF CUTOFF TRENCH

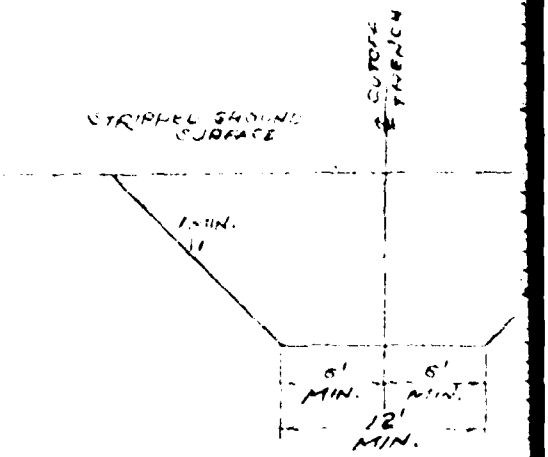
SCALE 1"=50' HOR. 1"=10' VERT.

FILE NO. 2756

HALEY & ALDRICH, INC.

PLAN VIEW OF CUTOFF TRENCH AND DRAINAGE BLANKET

SCALE

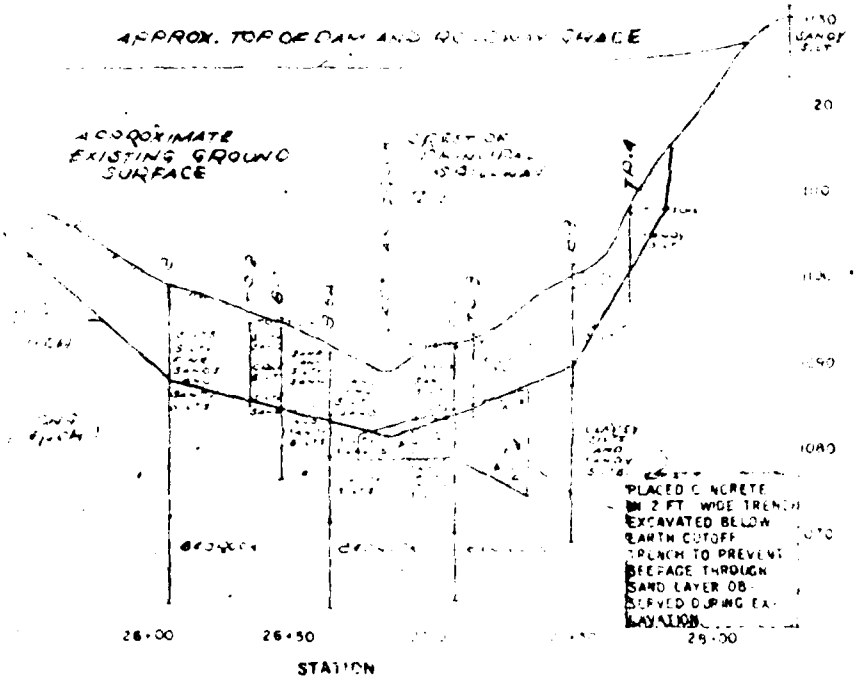


TYPICAL SECTION
CUTOFF TRENCH

SCALE

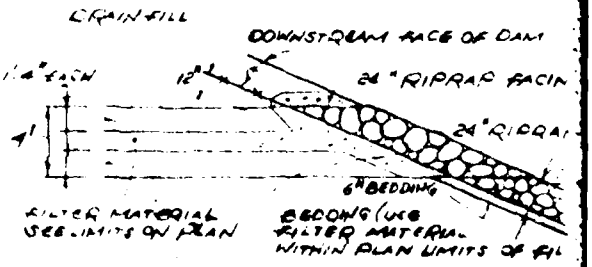
CUTOFF NOTES

1. Following excavation of trench to planned grades, bottom and sides will be examined by Haley & Aldrich Soil Engineers to determine need for deepening.
2. Excavation and backfilling to be carried out in the dry.
3. Backfill with approved impervious fill material, not less than 30% by dry weight finer than the No. 200 mesh sieve, maximum size 6".
4. Backfill to be placed in layers not greater than 8 in. in loose thickness, brought to approximately optimum moisture content, and thoroughly compacted to at least 100% of ASTM D-698 Maximum Dry Density.



PROFILE ALONG ℄ OF CUTOFF TRENCH

SCALE

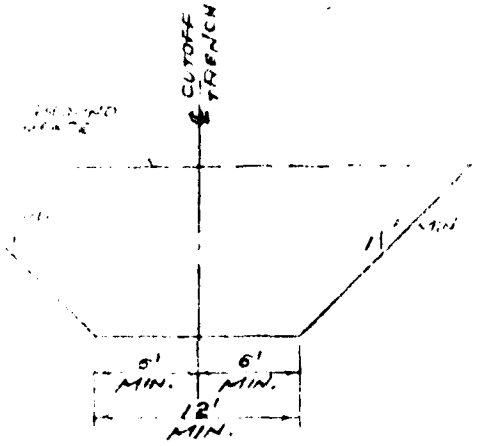


TYPICAL SECTION FOR RIP
GUTTER AND DRAINAGE BLA

NOT TO SCALE

NOTES.

1. FINAL LINE AND GRADE OF R. GUTTERS TO BE DETERMINED ENGINEER
2. DRAIN FILL COMPACTION TO BE
3. RIPRAP TO BE SET INTO CON IN VICINITY OF STILLING BASIN NECESSARY FOR BASIN CONSTR



TYPICAL SECTION
CUTOFF TRENCH
SCALE 1"=5'

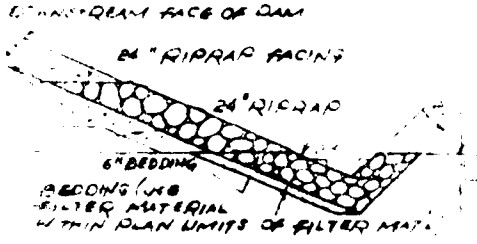
NOTES

...trench to planned grades, bottom and sides ... & Assist. Soil Engineer to determine

... be carried out in the dry.

... material not less than ... 200 mesh sieve, maximum

... pieces greater than 8 in. in loose ... at optimum moisture content, ... at least 100% of ASTM D698



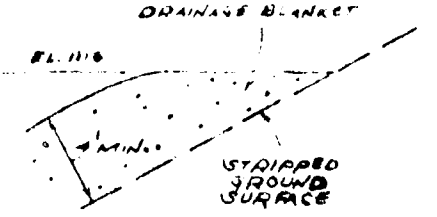
...ICAL SECTION FOR RIPRAP ...ILTER AND DRAINAGE BLANKET

NOT TO SCALE

... LINE AND GRADE OF RIPRAP ...TENDS TO BE DETERMINED BY ...INEER

... FILL COMPACTION TO BE CLASS 2.

...RAP TO BE SET INTO DAM FACE ...CINITY OF STILLING BASIN AS ...CESSARY FOR BASIN CONSTRUCTION.



SECTION A-A
NOT TO SCALE

RIPRAP AND DRAINAGE BLANKET MATERIAL
GRADATION REQUIREMENTS

R... RAP

Stilling Basin: 4 max. size, at least 50% larger than 2', at least 15% smaller than 12 inches.

Dam Slopes & Gutters: 2' max. size, at least 50% larger than 1 ft., at least 15% smaller than 8"

RIPRAP BEDDING

Sieve Size	Percent Finer By Weight
6"	100
2"	65-85
3/4"	45-70
#4	15-50
#10	0-25
#200	0-5

DRAIN FILL

Sieve Size	Percent Finer By Weight
6"	100
2"	95-100
3/4"	80-100
#4	55-100
#20	15-80
#200	0-3

FILTER MATERIAL

Sieve Size	Percent Finer By Weight
1"	100
3/4"	90-100
3/8"	20-55
#4	0-10
#8	0-5

... Standard Stone Size #67)

NOTE: Gradation limits subject to adjustment by Engineer to meet filter criteria in relation to available borrow materials

NUMBER	DATE	DESCRIPTION
	9/22/72	CONSTRUCTION NOTES
	3/3/72	CHANGE CUTOFF AND 3 ROAD

REVISIONS

CONTROLLED ENVIRONMENT CORPORATION
GRANTHAM NEW HAMPSHIRE

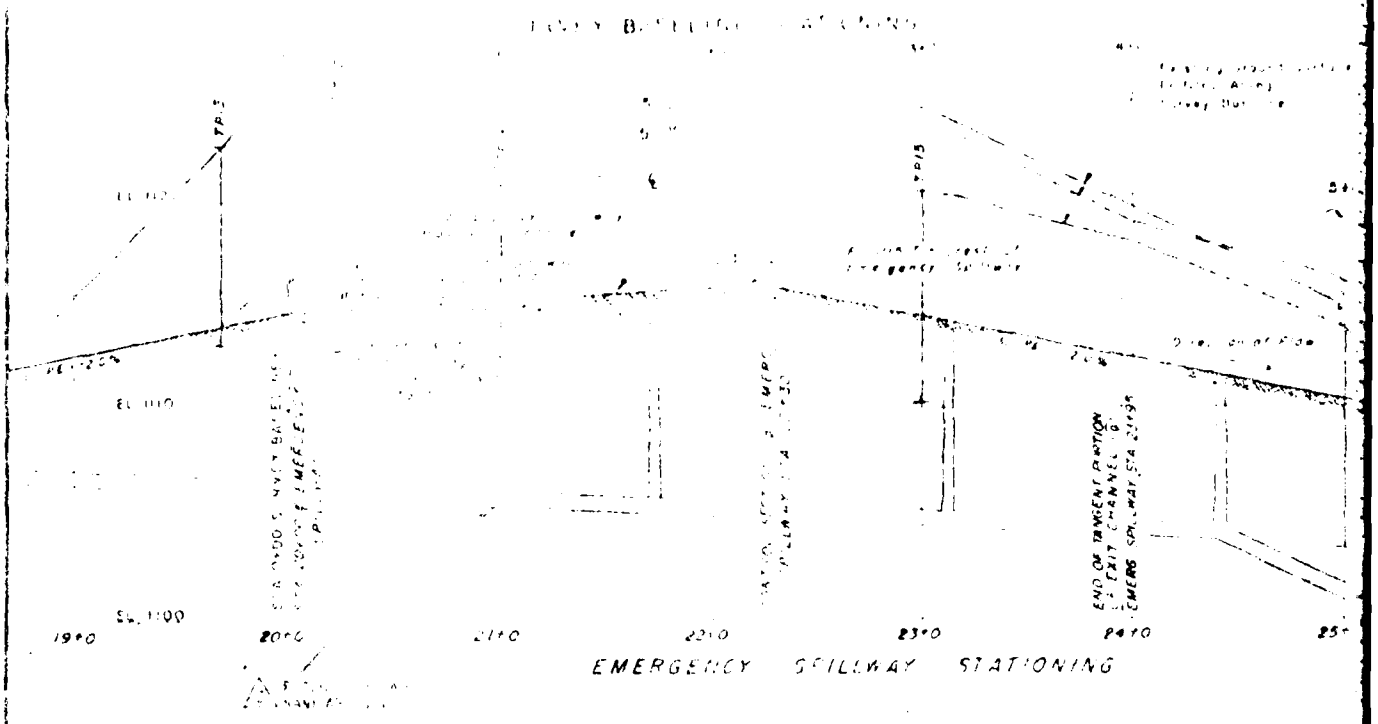
EASTMAN LAKE DAM

CUTOFF TRENCH AND DRAINAGE BLANKET

HALEY & ALDRICH, INC.
CONSULTING SOIL ENGINEERS
CAMBRIDGE, MASSACHUSETTS

DRAWN BY	CHECKED BY	APPROVED BY
RM	GRB	...

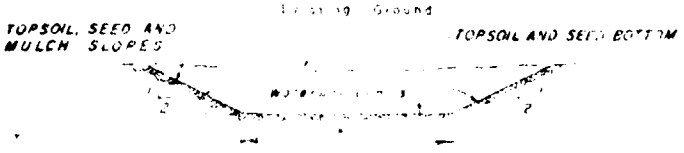
DATE	SCALE	SHEET NO
1/14/72	AS NOTED	3



EMERGENCY SPILLWAY STATIONING

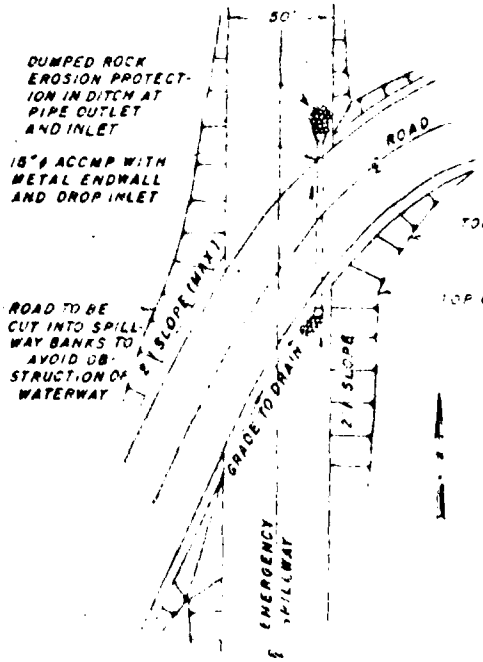
PROPOSED EMERGENCY SPILLWAY BOTTOM PROFILE

SCALES 1"=40' Horiz
1"=4' Vert



TYPICAL EMERGENCY SPILLWAY CROSS SECTION

SCALE

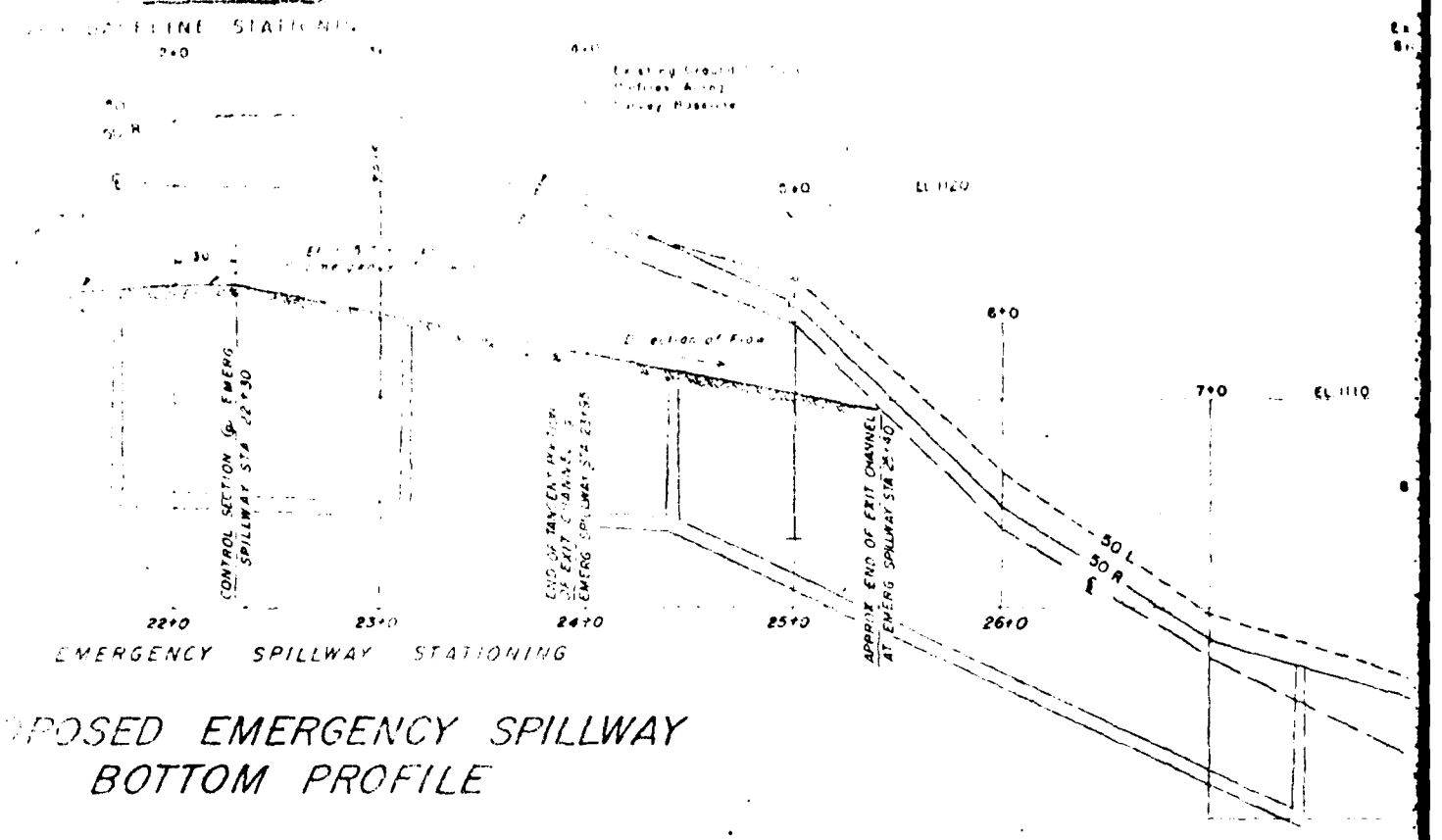


ROAD CROSSING DETAIL

SCALE 1"=40'

NOTE

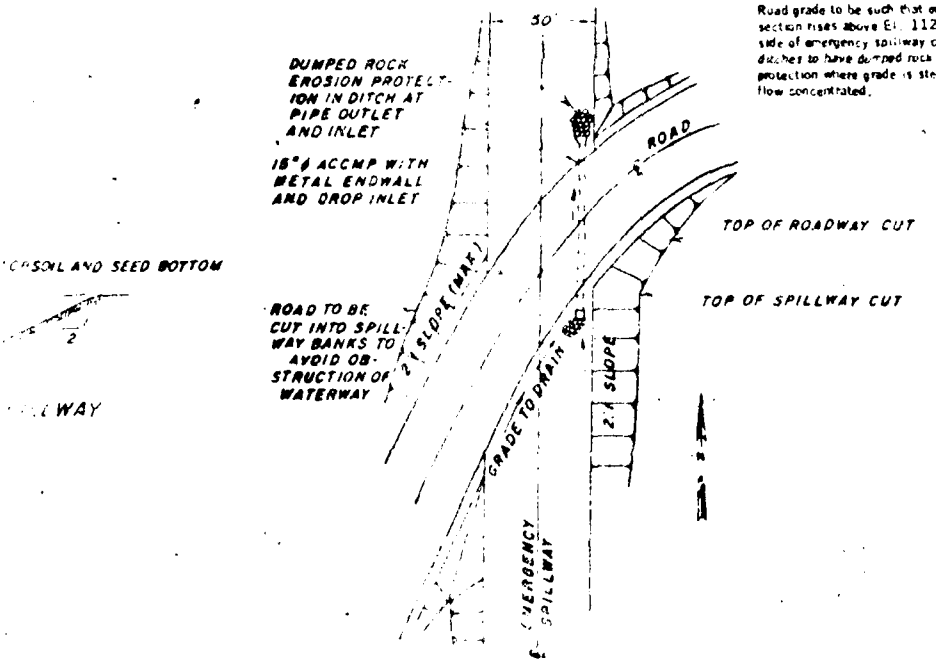
HALEY & ALDRICH INC



EMERGENCY SPILLWAY STATIONING

POSED EMERGENCY SPILLWAY BOTTOM PROFILE

SCALES 1"=40' Horiz
1"=4' Vert



ROAD CROSSING DETAIL

SCALE 1"=40'

TOPSOIL AND SEED BOTTOM

2

SPILLWAY

NOTE

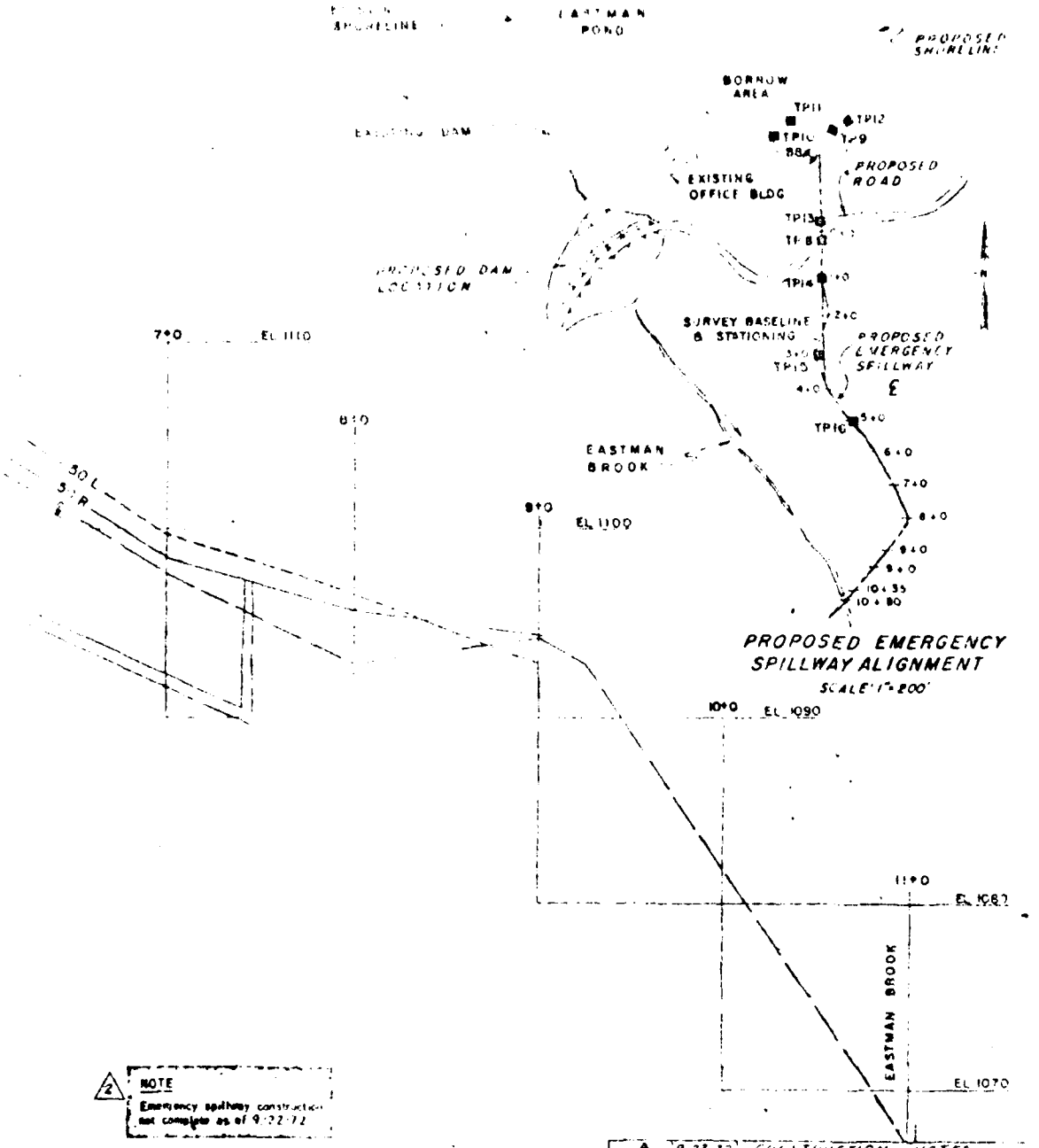
Road grade to be such that entire roadway section rises above El. 1125 to either side of emergency spillway cut. Roadway ditches to have dumped rock erosion protection where grade is steep and/or flow concentrated.

NOTE

Emergency spillway construction not complete as of 9-22-72.

NOTES

1. Spillway baseline alignment and ground surface p... along existing swale provided by Hayes Engr., ...
2. Emergency spillway centerline and road alignmen... established in field by Hayes Engineering, spill... to be straight from entrance at pond to Sta 23+...
3. Road crossing not to obstruct Emergency Spillwa... detail and grade requirement this sheet.
4. Elevation datum is U.S.G.S. Mean Sea Level.
5. Waterways and/or drainstone riprap gutters to be ... at the direction of the Engineer in areas of concen... treatment flow. Seepage from cut slopes to be drain... 18 in. thick blanket of Riprap Bedding material be... Blanket to extend down slope and 5 ft. out onto ...



PROPOSED EMERGENCY SPILLWAY ALIGNMENT

SCALE 1"=200'

⚠2 NOTE

Emergency spillway construction not complete as of 9-22-72

NOTES

1. Spillway baseline alignment and ground surface profiles along existing swale provided by Hayes Eng... Methuen, Mass.
2. Emergency spillway centerline and road alignment to be established in field by Hayes Engineering so ... centerline to be straight from entrance at pond to Sta. 2+50.
3. Road crossing not to obstruct Emergency Spillway. See detail and grade requirement this sheet.
4. Elevation datum is U.S.G.S. Mean Sea Level.
5. Waterways and/or downslope riprap gutters to be provided at the direction of the Engineer in areas of concentrated overland flow. Seepage from cut slopes to be drained by min. 18 in. thick blanket of Riprap Bedding material backed by spoil. Blanket to extend down slope and S.R. cut into soil ... bottom.

NUMBER	DATE	DESCRIPTION
2	9-22-72	CONSTRUCTION NOTES
1	3-3-72	ROAD CROSSING & SLOPE NOTES

REVISIONS

CONTROLLED ENVIRONMENT CORPORATION
GRANTHAM, NEW HAMPSHIRE

EMERGENCY SPILLWAY ALIGNMENT AND DETAILS

HALEY & ALDRICH, INC.
CONSULTING SOIL ENGINEERS
CAMBRIDGE, MASSACHUSETTS

DRAWN BY	CHECKED BY	APPROVED BY
RM	GRB	PLL

DATE	SCALE	SHEET NO
1/14/72	AS NOTED	4

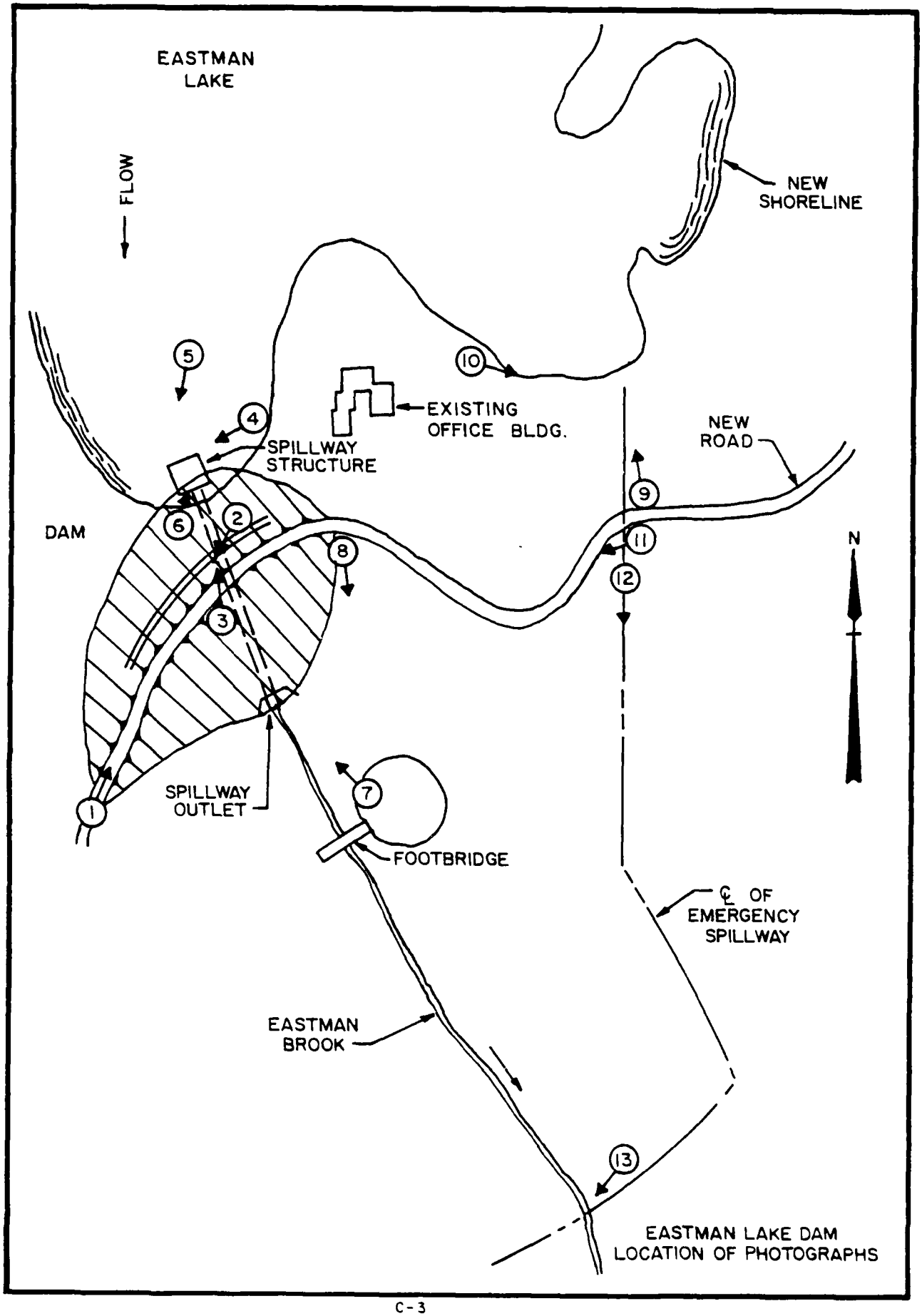
APPENDIX C

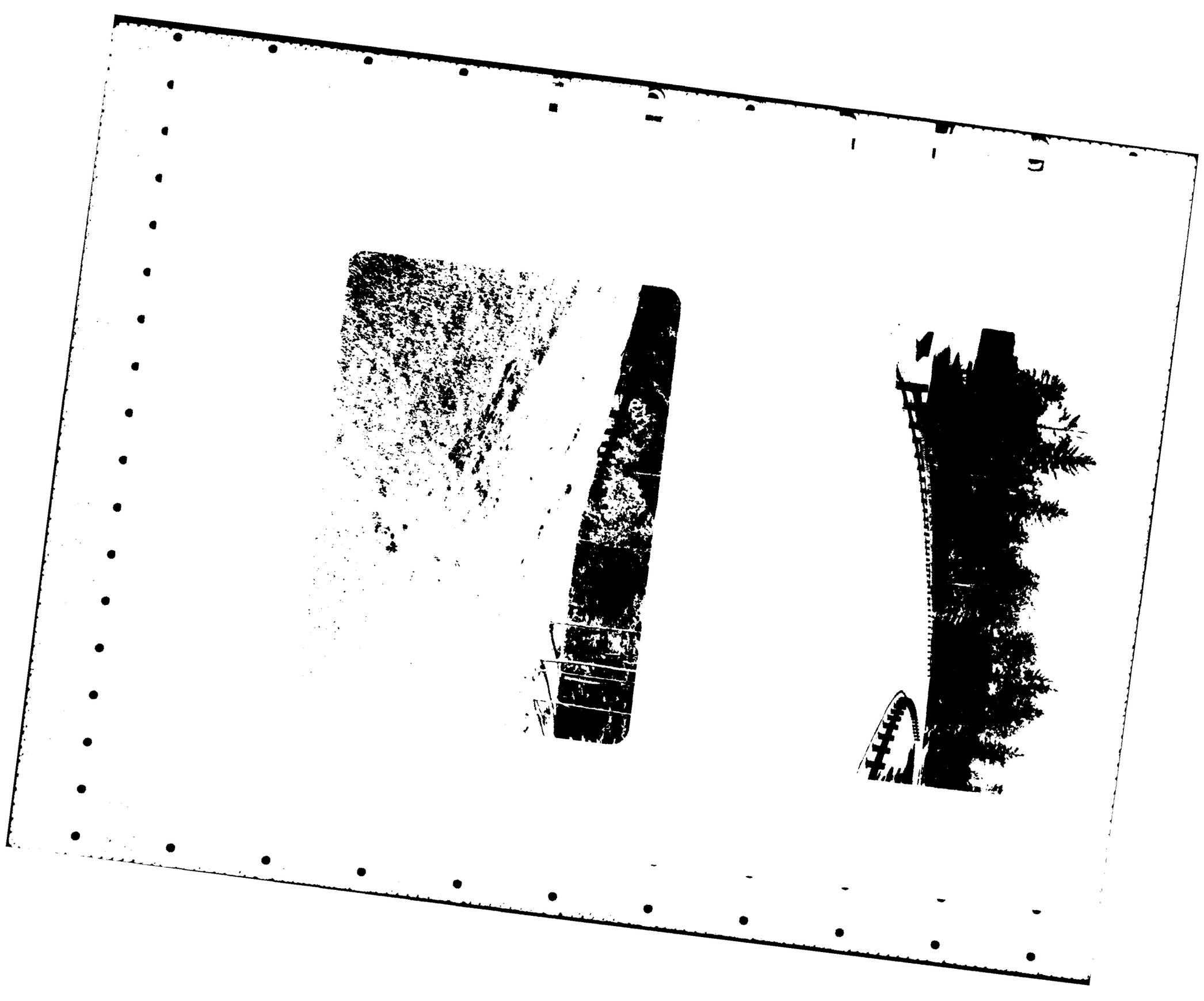
PHOTOGRAPHS

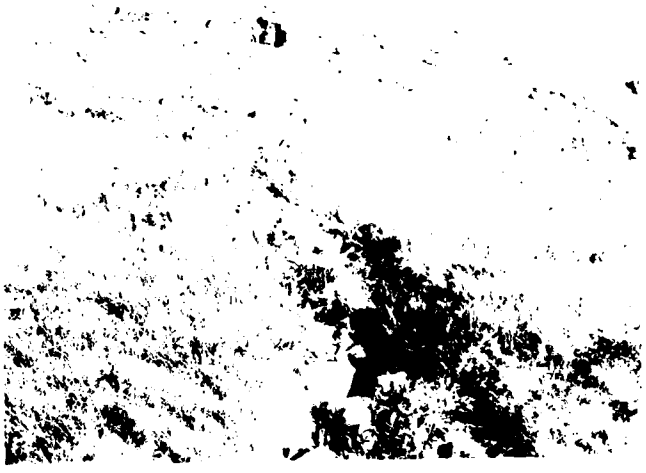
APPENDIX C

REPRESENTATIVE PHOTOGRAPHS OF PROJECT

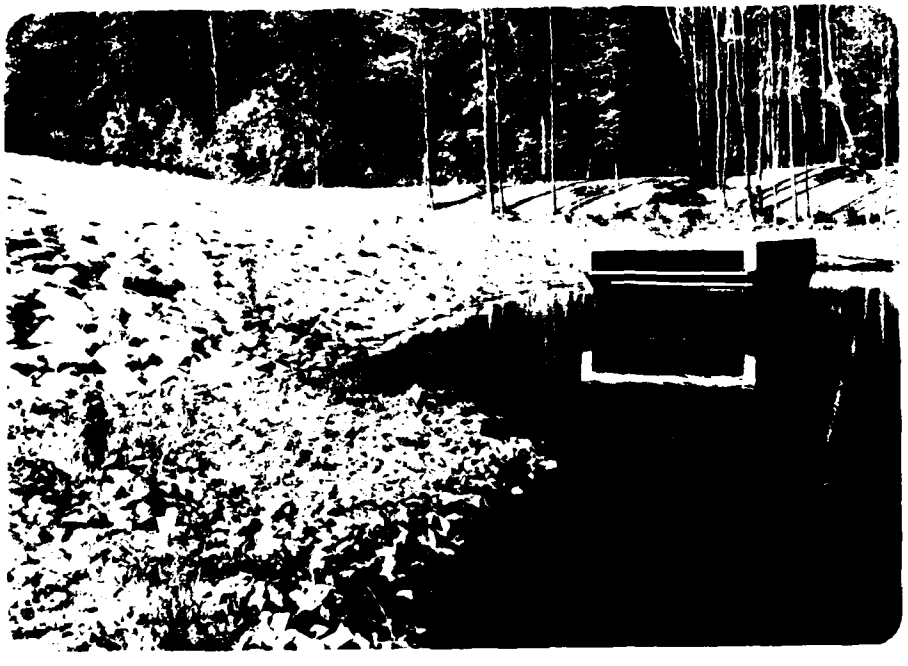
No.		Negative No.	Page
12.	Emergency spillway, unfinished, looking downstream, south	6-9A	C-10
13.	End of emergency spillway near Eastman Brook.	6-6A	6-10

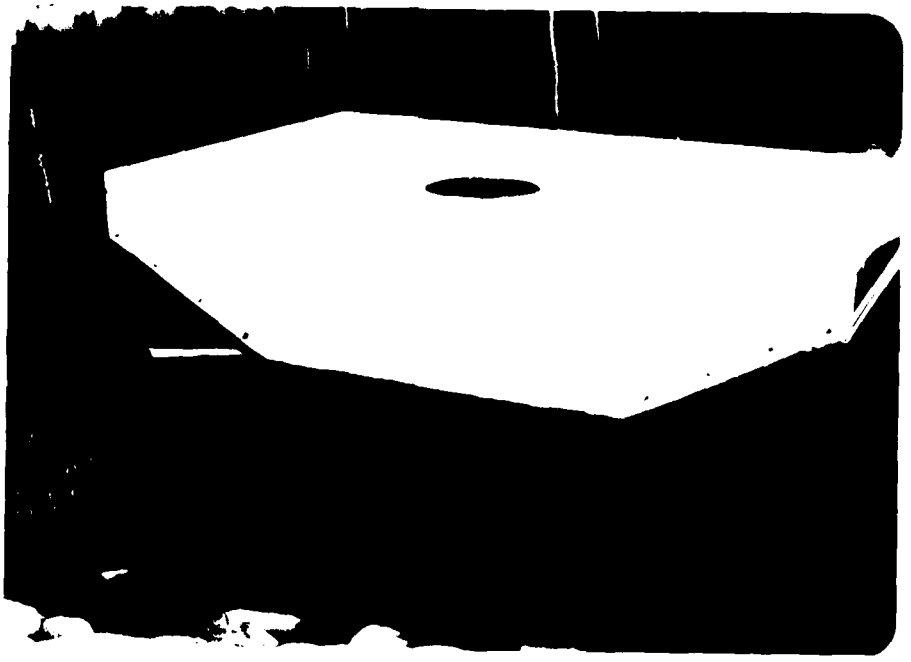

EASTMAN
LAKE
FLOW
NEW
SHORELINE
5
10
EXISTING
OFFICE BLDG.
4
SPILLWAY
STRUCTURE
NEW
ROAD
9
DAM
6
2
8
11
12
N
3
SPILLWAY
OUTLET
7
1
FOOTBRIDGE
℄ OF
EMERGENCY
SPILLWAY
EASTMAN
BROOK
13
EASTMAN LAKE DAM
LOCATION OF PHOTOGRAPHS



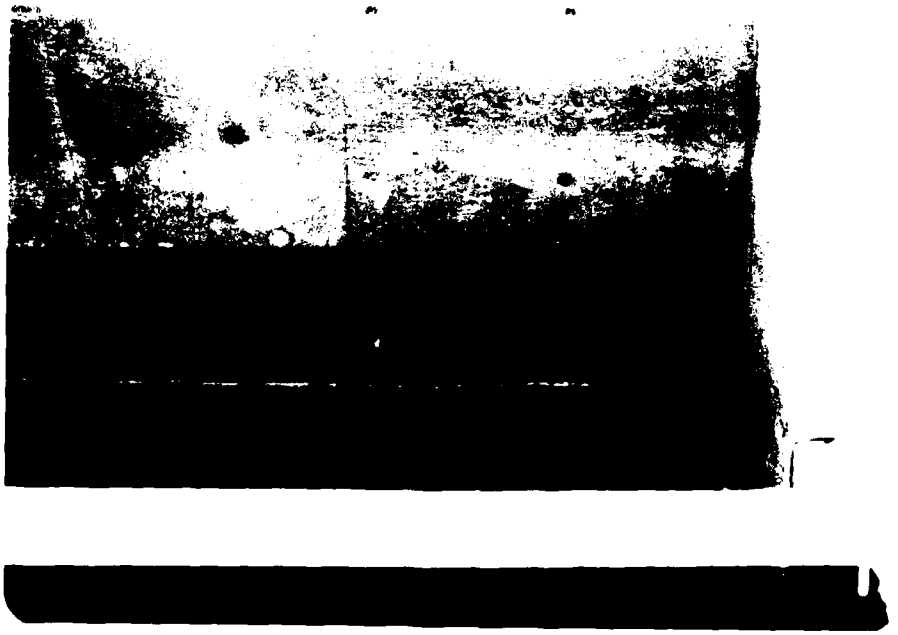


[illegible] of surface [illegible] the upstream [illegible] the berm.

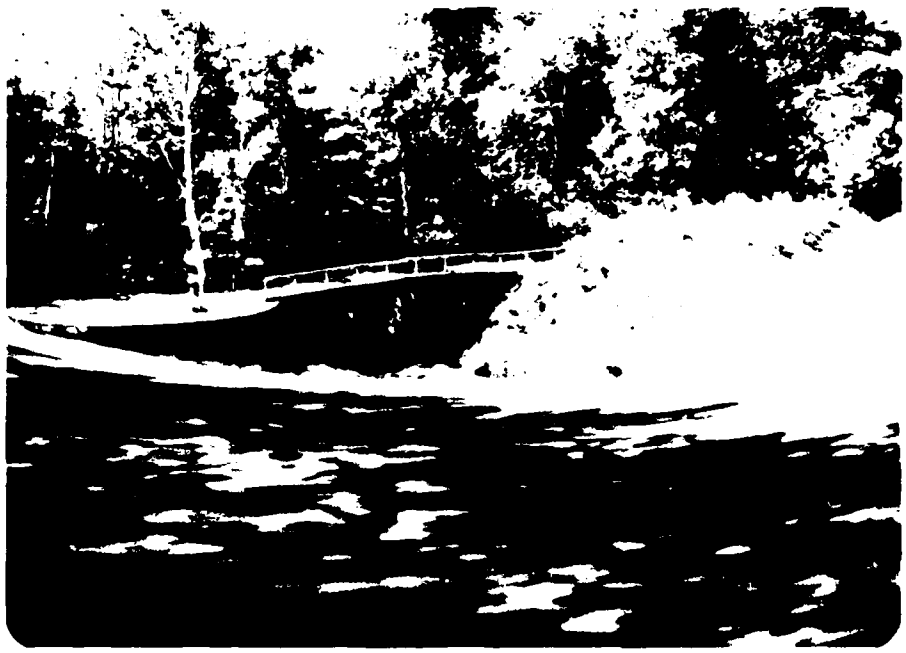


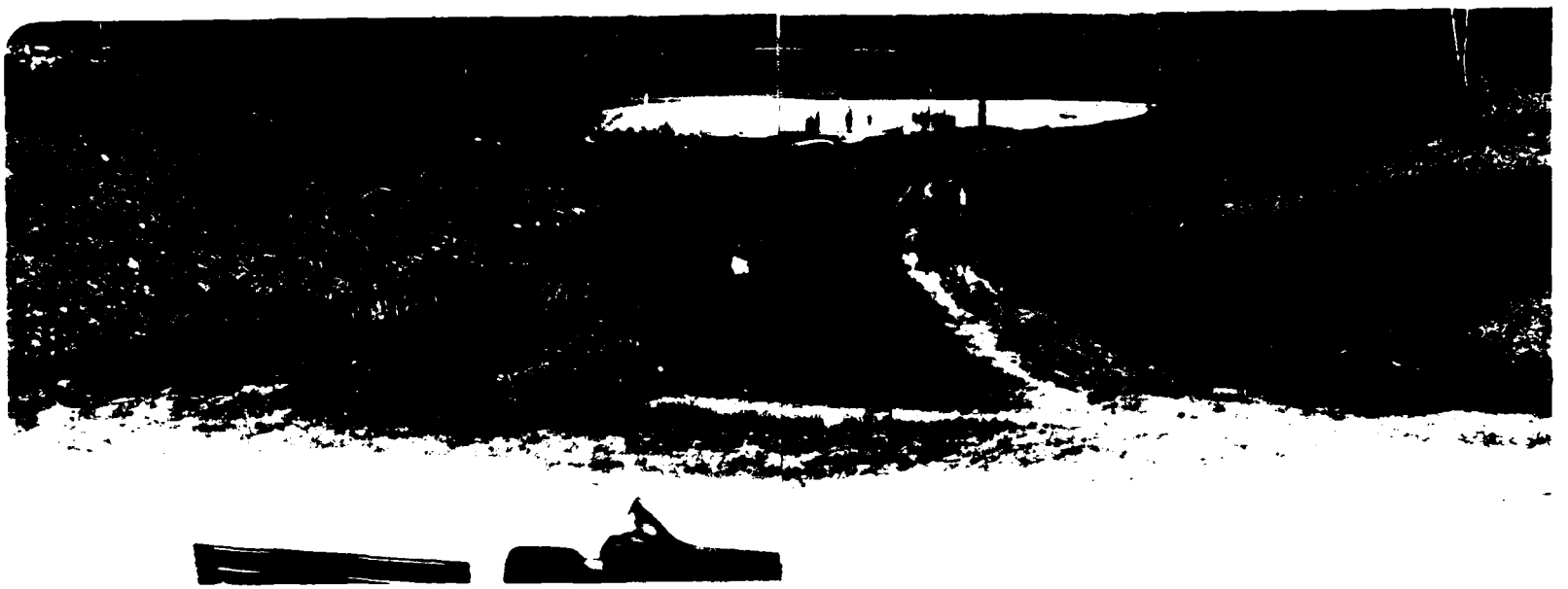


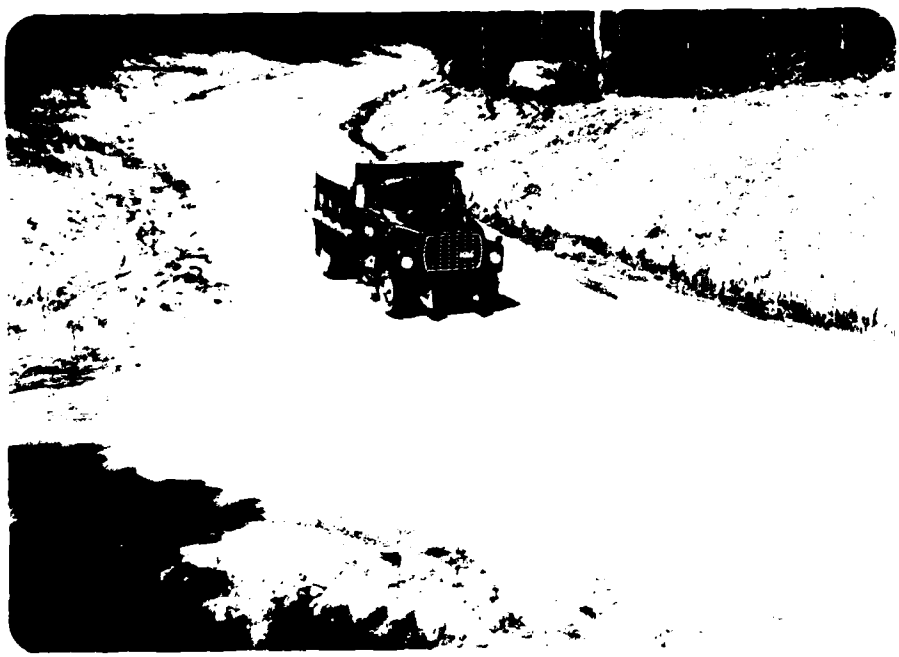
5. Intake Structure: Riser with Two Crests, Looking Northeast.



6. Crest in Inside of Intake Riser.







[illegible] Spillway, Unfinished, Looking Downstream, [illegible].

[illegible] Spillway [illegible]

APPENDIX D

HYDROLOGIC & HYDRAULIC COMPUTATIONS

FAY, SPOFFORD & THORNDIKE, INC.
ENGINEERS
BOSTON

PROJECT Eastman [illegible]

FILE NUMBER [illegible]
SHEET NUMBER 1 OF [illegible]
DATE [illegible]
COMPUTED BY [illegible]
CHECKED BY

SUBJECT NATIONAL DAM INSP. PROGRAM
EASTMAN POND DAM

Total drainage area of Eastman Pond Dam
= 7.5 sq miles

The drainage area of Eastman Pond Dam is characterized by mountainous terrain. Therefore from guide curves furnished by the Corps of Engineers, it is found that

PROBABLE MAXIMUM FLOOD PEAK INFLOW
= 7.5 x 2075
= 15 562.5 cfs.

= 15 560.0 cfs (say).

According to size classification in TABLE 1 in "Recommended Guidelines for Safety Inspection of Dams", Eastman Pond Dam is intermediate in size.

According to hazard potential classification in TABLE 2, it falls in the category of high hazard dam.

FAY SPOFFORD & THORNDIKE INC
ENGINEERS
BOSTON

PROJECT [illegible]

FILE NUMBER [illegible]
SHEET NUMBER [illegible]
DATE [illegible]
COMPUTED BY [illegible]
CHECKED BY [illegible]

SUBJECT NATIONAL DAM INSP. PROGRAM
EASTMAN POND DAM

a. Hydrologic and Hydraulic Evaluation

Conditions as given in Table 3.

SPILLWAY TEST FLOOD PEAK INFLOW

= 15,560 cfs.

FAY SPOFFORD & THORNDIKE INC
ENGINEERS
BOSTON

PROJECT [illegible]

FILE NUMBER [illegible]
SHEET NUMBER [illegible]
DATE [illegible]
COMPUTED BY [illegible]
CHECKED BY

SUBJECT EATON LAKE DAM

SPILLWAY TEST FLOOD INFLOW HYDROGRAPH
(BASED ON SCS DIMENSIONLESS UNIT HYDROGRAPH)

Main length of travel = 25,400 feet

Difference in elevation = 300 feet

$$T = \frac{(.5400)^{1.15}}{7700 \times (300)^{0.38}} = \frac{116294}{7700 \times 8.726}$$

$= 1.726$ hrs.

$\simeq 2.0$ hrs (use).

SPILLWAY TEST FLOOD PEAK INFLOW
= 15,560 cfs

FAY, SPOFFORD & THORNDIKE, INC.
ENGINEERS
BOSTON

PROJECT [illegible]

FILE NUMBER [illegible]
SHEET NUMBER 4 of [illegible]
DATE 2-7-1975
COMPUTED BY [illegible]
CHECKED BY

SUBJECT SPECTACLE LAKE DAM

SPILLWAY TEST FLOOD INFLOW HYDROGRAPH
(BASED ON U.S. DIMENSIONLESS UNIT HYDROGRAPH)

$T_p = 2.0$ hrs

SPILLWAY TEST FLOOD PEAK INFLOW (Q_{PI}) = 15,560 cfs

T (hrs)	T/Tp	Q/Qp	Q (cfs)
0.50	0.25	0.05	778
1.00	0.50	0.18	2800
1.50	0.75	0.73	11358
2.00	1.00	1.00	15560
2.50	1.25	0.80	12448
3.00	1.50	0.40	6227
3.50	1.75	0.25	3890
4.00	2.00	0.17	2645
5.50	2.75	0.06	934
7.00	3.50	0.02	311
8.00	4.00	0.01	156

FAY, SPOFFORD & THORNDIKE, INC.
ENGINEERS
BOSTON

PROJECT [illegible]

FILE NUMBER [illegible]
SHEET NUMBER 5 of [illegible]
DATE 6-7-[illegible]
COMPUTED BY [illegible]
CHECKED BY [illegible]

SUBJECT [illegible]
DISCHARGE WITH TWO FEET EMERGENCY SPILLWAY

Length of emergency spillway = 60 feet

Coefficient of emergency spillway = 11.27

Assume $2.95 \times C_d$ for emergency spillway = 2.95.

$$Q = 2.95 \cdot L \cdot H^{3/2}$$

H	EL.	Q (cfs)
1.0	1111.7	143.0
2.0	1117.7	463.0
3.0	1118.7	740.0
4.0	1119.7	1140.0
5.0	1120.7	1573.0
6.0	1121.7	2094.0
7.0	1122.7	2697.0
8 0	1123.7	3224.0
10.0	1125.7	4504.0
15.0	1130.7	8278.0
20.0	1135.7	12746.0
25.0	1140.7	17612.0

ENGINEERS BOSTON

PROJECT

SHEET NUMBER

SUBJECT EASTMAN LAKE DAM

DATE 2-9-1978

COMPUTED BY

CHECKED BY

ORIFICE CURVE FOR 3.5 FT DIAMETER PRINCIPAL SPILLWAY.

$$C \times \frac{\pi}{4} \times (3.5)^2 \times 8 \times \sqrt{h} = 225$$

$$h = 1115.7 - 1089.0 = 26.7 \text{ ft}$$

$$\therefore C \times \frac{\pi}{4} \times (3.5)^2 \times 8 \times \sqrt{26.7} = 225$$

$$\therefore C = \frac{225}{377.678} = 0.596.$$

$$Q_{P.S} = 0.596 \times \frac{\pi}{4} \times (3.5)^2 \times 8 \times \sqrt{h}$$

$$= 13.564\sqrt{h}.$$

DISCHARGE THROUGH DRAIN:

$$Q = 0.6 \times \frac{\pi}{4} \times (2.5)^2 \times 8 \times \sqrt{h}$$

$$= 23.56\sqrt{h}$$

At principal spillway EL. 1109

$$Q = 23.56 \times \sqrt{15}$$
$$= 91.25 \text{ cfs}$$
$$= 90.0 \text{ cfs (say)}$$

At maximum EL. 1115.7

$$Q = 23.56 \times \sqrt{21.7}$$
$$= 109.75 \text{ cfs}$$
$$= 110.0 \text{ cfs (say)}$$

FAY SPOFFORD & THORNDIKE INC
ENGINEERS
BOSTON

PROJECT [illegible]

FILE NUMBER EM-[illegible]
SHEET NUMBER 7 of [illegible]
DATE [illegible]
COMPUTED BY [illegible]
CHECKED BY

SUBJECT EARTHFILL LAKE DAM

COMPOSITE DISCHARGE RATING TABLE FOR PRINCIPAL SPILLWAY AND EMERGENCY SPILLWAY.

ELEV.	H_1 (ft)	$Q_{P.S}$ (cfs)	$Q_{E.S}$	Q_{TOTAL} (cfs)
1105	16	174.0		174.0
1107	18	185.0		185.0
1109	20	195.0		195.0
1110	21	200.0		200.0
1112	23	209.0		209.0
1114	25	218.0		218.0
1115.7	26.7	225.0		225.0
1116.7	27.7	229.0	143.0	372.0
1117.7	28.7	233.0	403.0	636.0
1118.7	29.7	237.0	740.0	977.0
1119.7	30.7	241.0	1140.0	1381.0
1120.7	31.7	245.0	1593.0	1838.0
1121.7	32.7	249.0	2094.0	2343.0
1122.7	33.7	253.0	2639.0	2892.0
1123.7	34.7	257.0	3224.0	3481.0
1125.7	36.7	264.0	4504.0	4770.0
1130.7	41.7	281.0	8278.0	8559.0
1135.7	46.7	298.0	12746.0	13044.0
1140.7	51.7	313.0	17812.0	18125.0

FAY SPOFFORD & THORNDIKE INC
ENGINEERS
BOSTON

PROJECT [illegible]

FILE NUMBER [illegible]
SHEET NUMBER 2 OF [illegible]
DATE [illegible]
COMPUTED BY [illegible]
CHECKED BY

SUBJECT EASTON'S LAKE DAM

[illegible] TABLE [illegible]

ELE.	[illegible] (ACRE-FEET)
1110.0	2.7
1111.5	2500
1120.0	4000
1122.0	4[illegible]

FAY SPOFFORD & THORNDIKE INC
ENGINEERS
BOSTON

PROJECT EM-1[illegible](1)

FILE NUMBER [illegible]
SHEET NUMBER 9 of [illegible]
DATE [illegible]
COMPUTED BY [illegible]
CHECKED BY

SUBJECT EASTERN LAND DAM
TO DETERMINE PEAK OUTFLOW

SPILLWAY TEST FLOOD PEAK INFLOW (Q_R) = 15,560 cfs

TRIAL #1

Assume runoff volume = 19" of runoff from DA

Available surcharge storage upto the top of dam

$$= \frac{395 \times 16}{2.5 \times 640} \times 12$$

$$= 15.4 \text{ inches of runoff from DA}$$

$$\frac{\text{Surcharge storage Vol.}}{\text{Inflow runoff Vol.}} = \frac{15.4}{19} = 0.81$$

Referring to Figure 17-11 in SCS NEH, Section 4

Corresponding

$$\frac{\text{OUTFLOW PEAK RATE}}{\text{INFLOW PEAK RATE}} = 0.27$$

$$\text{OUTFLOW PEAK RATE} = 0.27 \times 15\,560$$

$$= 4201 \text{ cfs} \qquad (1)$$

TRIAL #2:

FAY SPOFFORD & THORNDIKE INC
ENGINEERS
BOSTON

PROJECT EM-1066(1)

FILE NUMBER
SHEET NUMBER 16
DATE 12-5-
COMPUTED BY
CHECKED BY

SUBJECT RESERVOIR DAM

TO DETERMINE PEAK OUTFLOW

From the composite discharge rating curve the above outflow Peak Rate corresponds to ELE. 1125.0

i.e Surcharge height above Municipal spillway crest = 16 feet.

Vol. of Surcharge = $\frac{385 \times 16}{7.5 \times 640} \times 12$
(STOR$_1$)

= 15.4 inches of runoff

∴ PEAK OUTFLOW $Q_{P_2} = Q_{P_1}\left(1 - \frac{STOR_1}{19}\right)$ (A)

$= 15,560\left(1 - \frac{15.4}{19}\right)$

$= 15,560\left(1 - 0.810\right)$

= 2956 cfs. (2)

TRIAL #3:

From the composite discharge rating curve, the above outflow Peak Rate corresponds to ELE. 1122.7

i.e. Surcharge height above municipal spillway crest
= 13.7 feet

FAY SPOFFORD & THORNDIKE INC
ENGINEERS
BOSTON

PROJECT EN-661(6)

FILE NUMBER 5A-62
SHEET NUMBER 11.9.5
DATE 4-15-1977
COMPUTED BY [illegible]
CHECKED BY

SUBJECT SPRINGFIELD DAM
TO DETERMINE PEAK OUTFLOW

Vol. of Surcharge (STR_1) $= \frac{385 \times 12.7}{7.5 \times 640} \times 12$

$= 12.17$ inches of runoff.

Now, apply the above equation

∴ PEAK OUTFLOW $Q_{P_2} = 15,560\left(1 - \frac{13.17}{19}\right)$

$= 15,560\,(1 - 0.694)$

$= 15,560 \times 0.306$

$= 4761$ cfs. (3)

TRIAL #4:

From the composite discharge rating curve, the above outflow peak rate corresponds to ELE. 1125.8

i.e. Surcharge height = 16.8 feet.

∴ Vol. of Surcharge (STR_2) $= \frac{385 \times 16.8}{7.5 \times 640} \times 12$

$= 16.17$ inches of runoff.

Average of STR_1 and STR_2 $= \frac{13.17 + 16.17}{2} = 14.68''$

∴ PEAK OUTFLOW $Q_{P_3} = 15560\left(1 - \frac{14.68}{19}\right)$

FAY SPOFFORD & THORNDIKE INC
Engineers
Boston

SUBJECT EASTHILL POND DAM
TO DETERMINE PEAK OUTFLOW.

PROJECT EM-271(6)

FILE NUMBER EM-271
SHEET NUMBER 12 of
DATE 12-27-71
COMPUTED BY WLH
CHECKED BY

∴ PEAK OUTFLOW Q_{13} = 15,560 (1 - .772)

= 15,560 × 0.228

= 3548 cfs

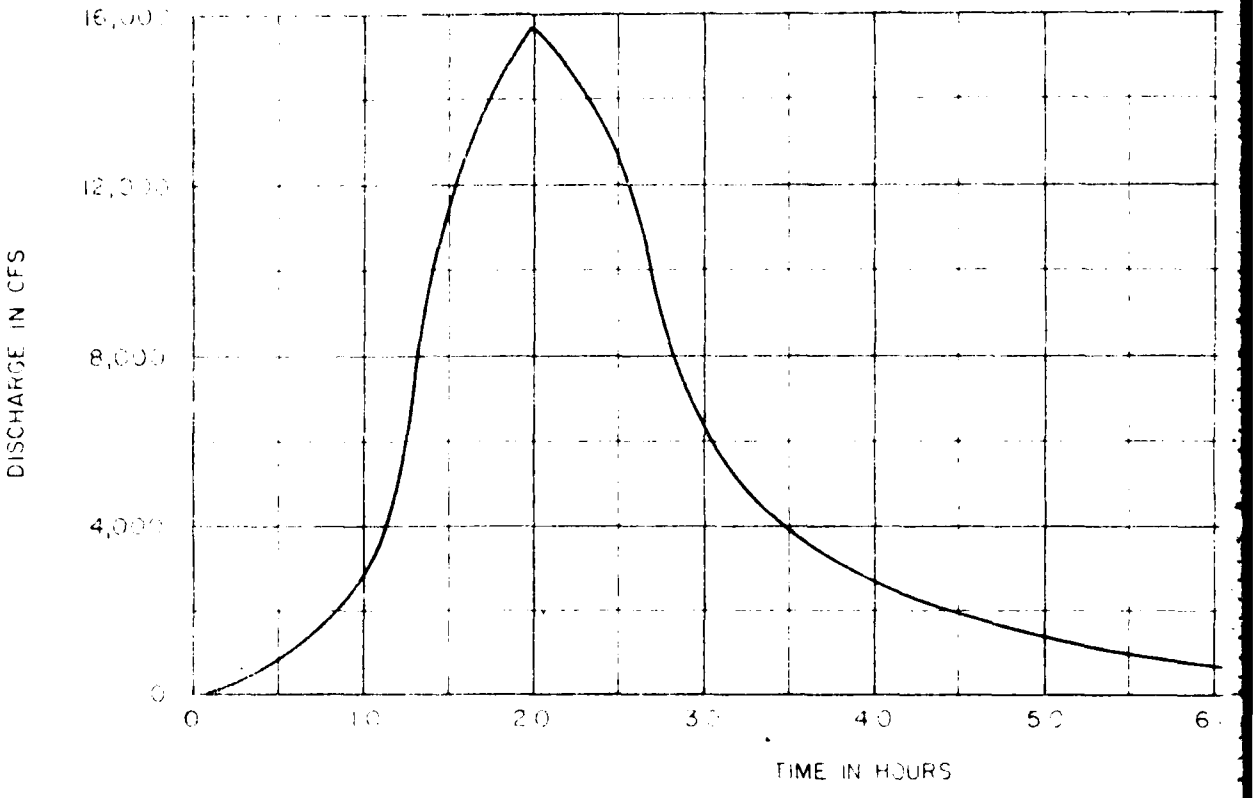
The Critical Pond and Emb. Elev. 1123.4 from plot
Embankment Crest Length.

Concrete Lt. Abut. Crest of
Principal Spillway = 14.9 ft.

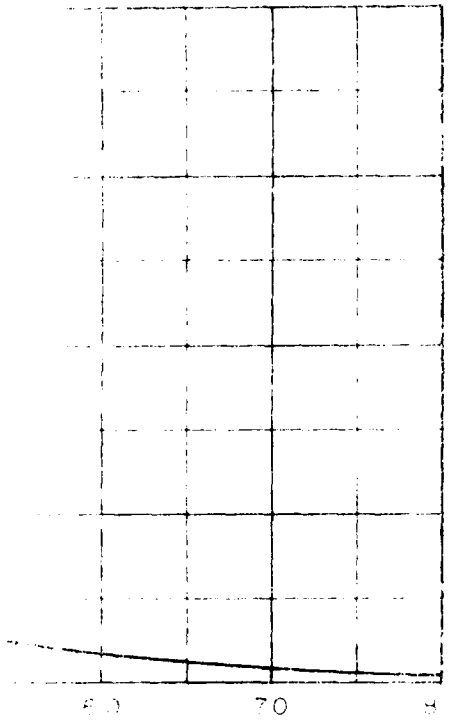
Concrete Lt. Abut. Crest of
Emergency Spillway = 8.2 ft.

Elev. of Top of Dam = 1125.0. Hence the
Dam is not overtopped due to Spillway
Test inflow Flood.

∴ PEAK OUTFLOW = 3548 cfs. (4)



SPILLWAY TEST FLOOD INFLOW HYDROGRAPH



OGRAPH

FAY, SPOFFORD & THORNDIKE, INC ENGINEERS BOSTON, MASS	U S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS

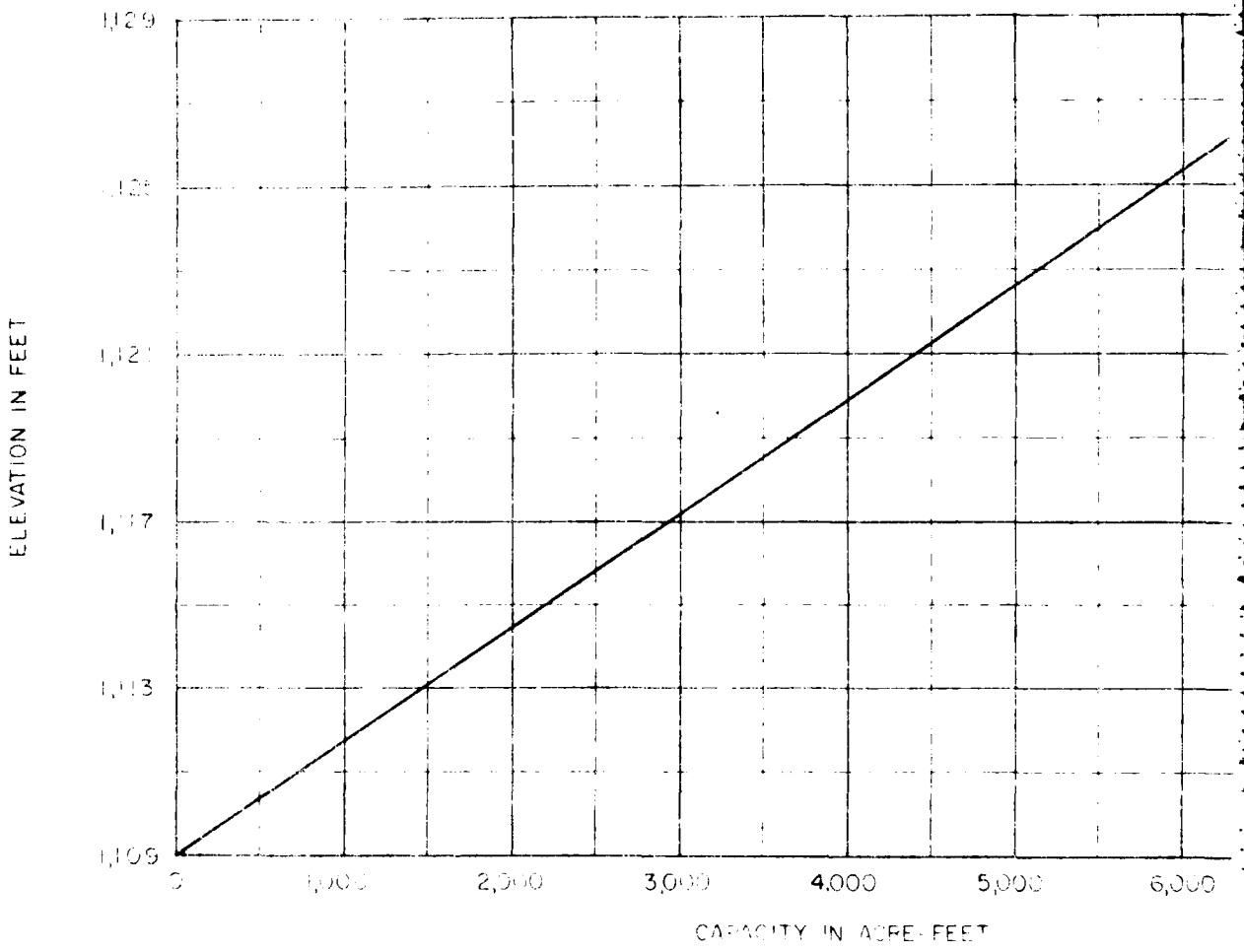
NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

EASTMAN POND DAM

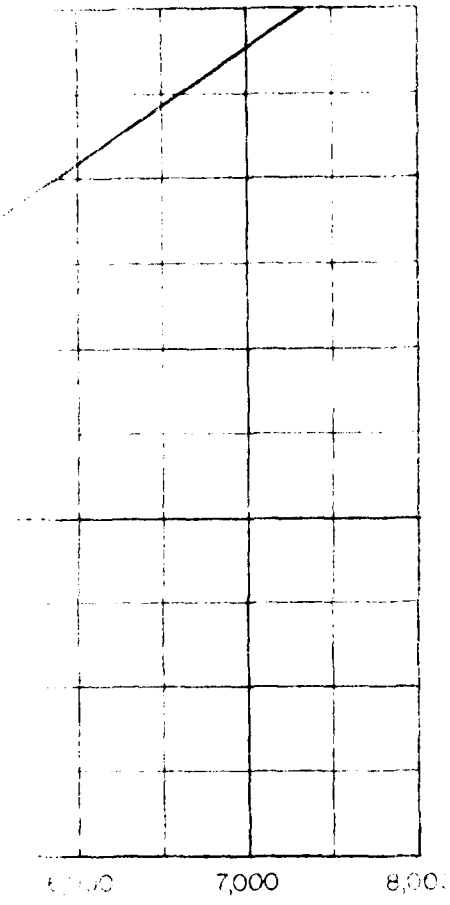
EASTMAN (PROV.) NEW HAMPSHIRE

			SCALE	AS SHOWN
			DATE	AUGUST, 1978

D-18



STORAGE CAPACITY – ELEVATION CURVE



FAY, SPOFFORD & THORNDIKE, INC ENGINEERS BOSTON, MASS.	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS

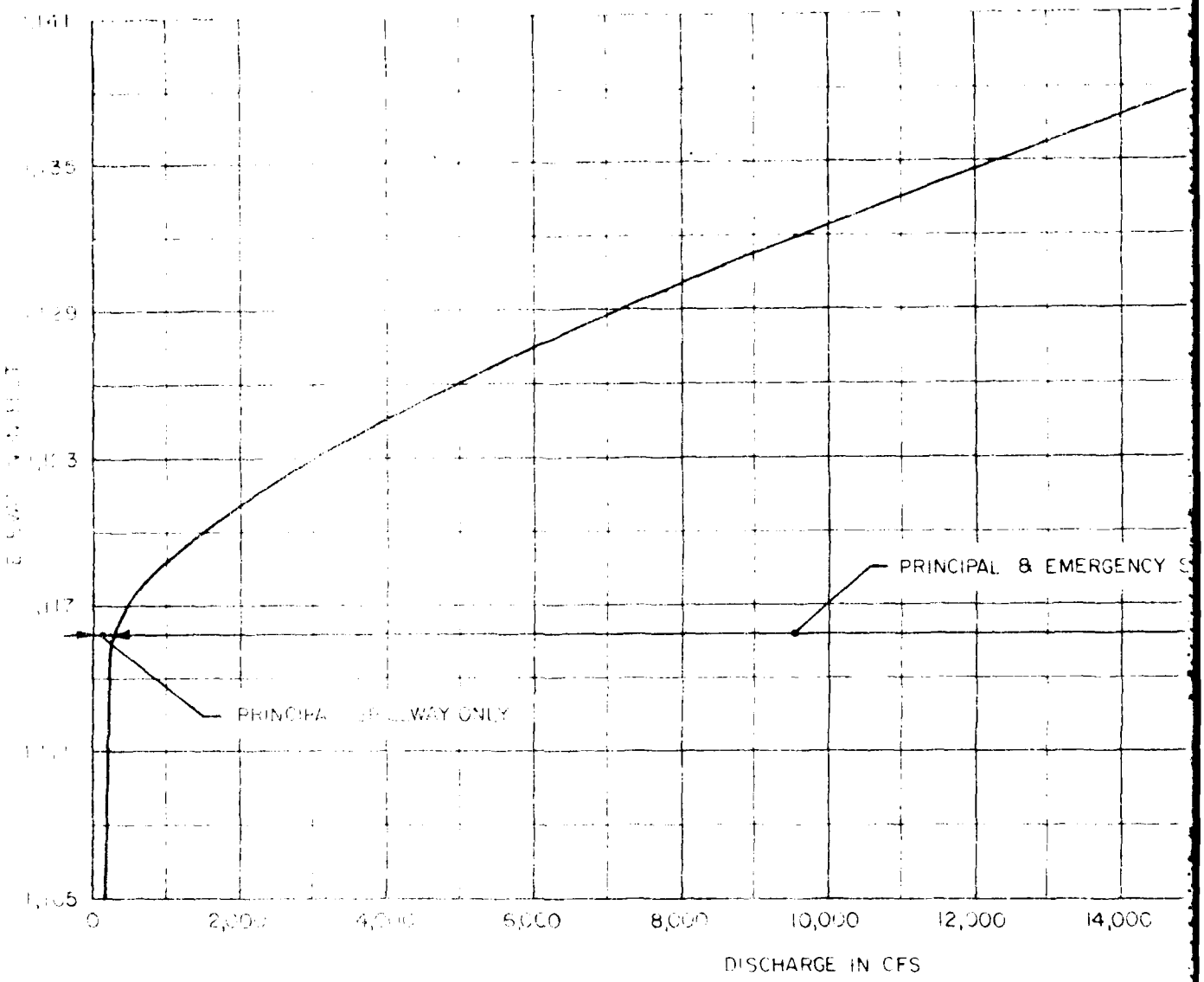
NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

EASTMAN POND DAM

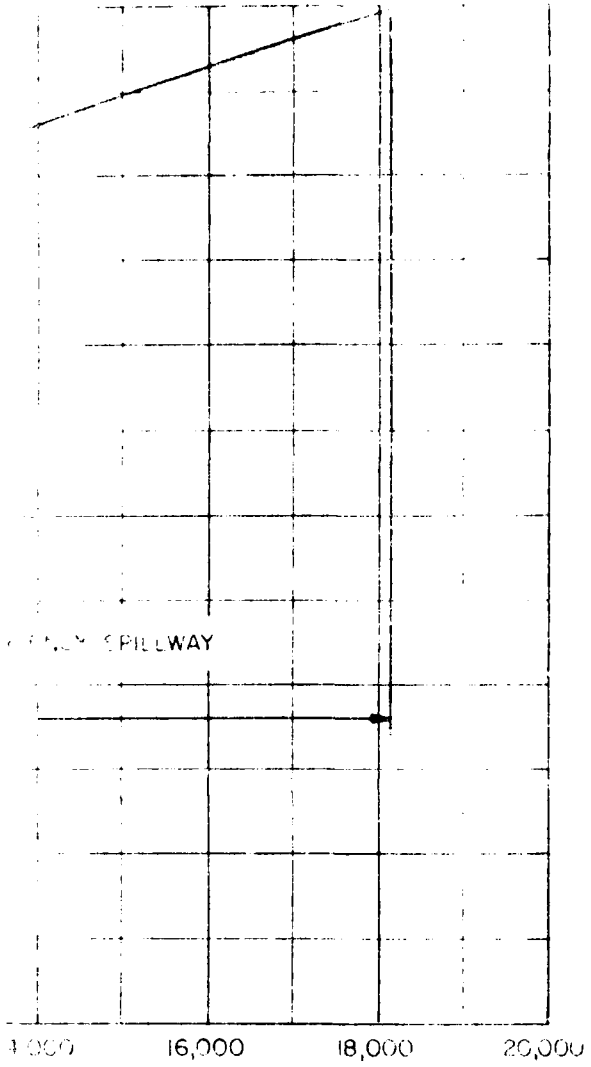
EASTMAN BROOK NEW HAMPSHIRE

SCALE	AS SHOWN
DATE	AUGUST, 1978

D-1



COMPOSITE RATING CURVE FOR SPILLWAY AND EMERGENCY S



ENCY SPILLWAY

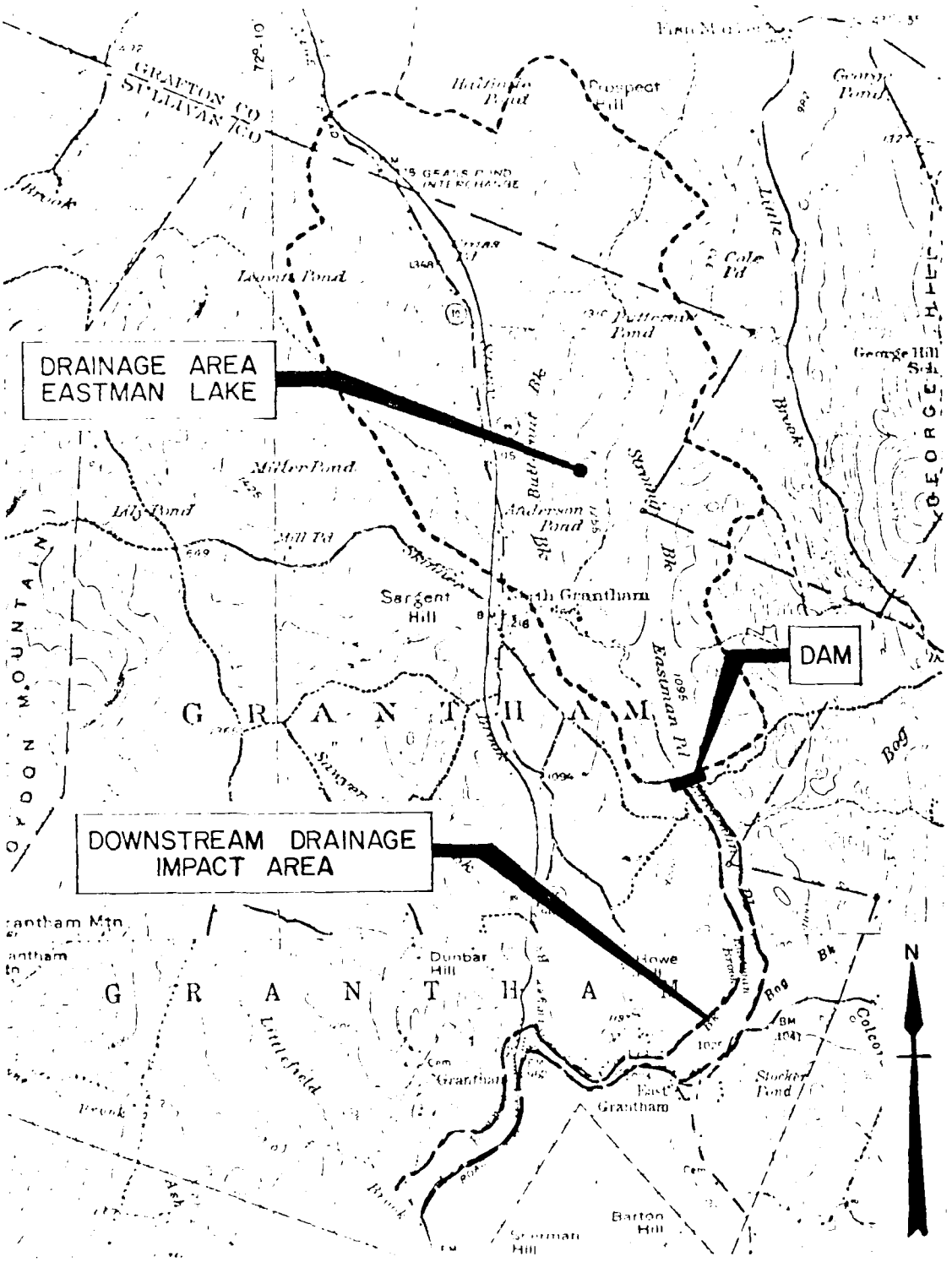
FAY, SPOFFORD & THORNDIKE, INC ENGINEERS BOSTON, MASS.	U S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

EASTMAN POND DAM

EASTMAN BROOK — NEW HAMPSHIRE

			SCALE AS SHOWN
			DATE AUGUST, 1978



SCALE 1:62500 (ACTUAL)

UNITED STATES
DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY

SUNAPEE, N.H. 1955
AMS 6570-I-SERIES V712
MASCOMA, N.H. 1927

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

STATE	COUNTY	NUMBER	NAME	LATITUDE (DMS)	LONGITUDE (DMS)	GEOLOGIC REF. NO.
[illegible]	[illegible]	[illegible]	EASTMAN LAKE DAM	4335.5	7207.0	0004070

PUBLIC NAME	NAME OF IMPOUNDMENT
EASTMAN POND DAM	EASTMAN POND

CONG. DIST.	RIVER OR STREAM	NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	STATUTE MILES	POPULATION
01	EASTMAN BROOK	EAST GRANTHAM	2	100

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STORAGE (ACRE-FEET)	HYDRAULIC HEIGHT (FEET)	IMPOUNDING CAPACITIES MAXIMUM (ACRE-FEET)	IMPOUNDING CAPACITIES NORMAL (ACRE-FEET)	DIST	OWN	FED R	PRV/FED	SCS A	VER/GATE
REPD	1972	RC	45	40	9225	3350	NED	N	N	N	N	29SEP78

REMARKS

NUMBER OF SPILLWAY	SPILLWAY LENGTH (FEET)	SPILLWAY TYPE	SPILLWAY WIDTH (FEET)	MAXIMUM DISCHARGE (CFS)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PLANNED (MW)	NAVIGATION LOCKS LENGTH (FEET)	NAVIGATION LOCKS WIDTH (FEET)
1	615	C	21	3225					

OWNER	ENGINEERING BY	CONSTRUCTION BY
CONTROLLED ENVIRONMENT CORP	HALEY + ALDRICH INC	

REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NH WATER RES BD	NH WATER RES BD	NH WATER RES BD	NH WATER RES BD

INSPECTION BY	INSPECTION DATE DAY	MO	YR	AUTHORITY FOR INSPECTION
FAY SPOFFORD + THORNDIKE, INC	07	JUN	78	PL92-367

REMARKS

END

FILMED

8-85

DTIC